Radio Communication

February 1990

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VOLUME 66 No 2 FEBRUARY 1990

CONTENTS

The White Rose Receiver — page 35.

Newly installed President Frank Hall, GM6BZX — page 7.

Mike Parent of the Polar Amateur Radio Club — page 63.

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 1913. Incorporated 1926. Limited by guarantee
Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Membership Services Department from which full details of Society services may also be obtained.

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COUNCIL BRIEF

23 November 1989

■ The Chairman of the IARU Committee, G3GVV, discussed the importance of the forthcoming IARU Region 1 Conference in Spain and advised Council on the RSGB delegation. The availability of Conference papers was discussed. Council agreed to discuss its frequency policy plan at the next meeting of Council as a prelude to the Region 1 Conference and the World Administrative Radio Conference (WARC) which is to take place in 1992 at which the future of several key amateur bands might be at stake.

■ Council discussed subscription rates and agreed to increase the Home Corporate rate as from 1 March 1990. A figure of at least 20 months of inflation needed to be applied and after discussion Council agreed to increase the Home Corporate rate to £25 per annum and other rates on a pro rata basis. A notice would be published in the January issue of *RadCom*.

■ Reduced subscriptions were discussed and it was agreed that this topic would be referred to the F&S Committee for further discussion.

■ Council, on a recommendation from the Finance and Staff Committee, agreed to reduce accounting complexities by adopting the principle of a common renewal date for all RSGB members; the first common renewal date being 1 July 1991.

■ The Honorary Treasurer reported on the new accounting policy, as a result of which the HQ Accountant had been made redundant and an external Accountant had been employed to advise the Society and oversee the production of monthly accounts as soon as possible. The Honorary Treasurer reported on problems in the accounts department which had been discovered after the Accountant had left the Society's employment. He noted that the Secretary, Acting General Manager and the new Accounts Manager were to be thanked for their considerable efforts in clearing up matters in the accounts department as quickly as possible. At the request of the Secretary, Council agreed to publish a statement in *RadCom* which reported problems that had been experienced in the accounts department as soon as matters had been resolved.

■ The Honorary Treasurer advised Council that it would be advantageous to move as rapidly as possible over to an integrated accounting software system. It would enable senior staff, F&S and Council to routinely monitor performance to a better level than the existing hybrid computer/manual system. It would also prove more efficient and thus enable cost savings to be made in the future.

■ On a recommendation from the Membership Liaison Committee, Council agreed to dispense with the services of the RI.O for South Yorkshire, Ian Abel, G3ZIII. At the previous Council meeting Council had discussed with Mr Abel conflicts between his own activities and his role of an RI.O. Council believed that the conflict still existed, but also acknowledged the fact that he had made genuine contributions to the Society's work at local level.

■ The Secretary reported on the six meetings that had been held since the last Council meeting with the Training and Education Group, the DTI, etc, on Project YEAR work. Discussion took place on the proposed Novice Licence Training Course.

■ The Secretary reported that he had visited the DVLC. A note would appear in *RadCom* to inform members of the current position.

■ Progress with new arrangements for the QSL Bureau was reported as was work on the Annual Meeting (AGM/EGM), Council elections and the Ardrossan ceremony.

■ On recommendation from the Secretary, supported by the F&S Committee, David Simmonds, G3JKB, was appointed General Manager as from 1 January 1990.

■ New Trustees for the RSGB Legacy Fund were to be G3VPK, G2AMV and G3AEZ.

■ Scrutineers for the 1990 Council Election were agreed by Council.

■ G3RZP discussed equipment standards for the Novice Licence and suitable kits.

■ G3HB reported on the recent meeting of the RAE Advisory Committee.

■ Council formally thanked the ARRL for permission to reproduce the *QST* article entitled 'The Bardstown Experiment'.

■ Other matters discussed included awards, affiliations, reduced subscriptions, GB2RS, amateur radio exhibitions,

members' ads, public relations, *RadCom* advertising, CB set conversions and the Amateur Radio Certificate.

News from the HF Contests Committee

NFD 1990
The NFD report for 1989 in the November issue of *Radio Communication* mentioned that the 1990 NFD date would be on the second weekend in June, the 9-10. This date was provisionally agreed following a request from IARU Region 1 to avoid a clash with the continental Whitsun holiday. Subsequent to the changed date being announced, we have been informed that DARC and others have decided not to move from the first weekend. IARU have now confirmed that the Region 1 CW FD (and thus NFD) for 1990 will be on the weekend of 2-3 June. No changes are expected in the rules which are published on page 65 of this issue of *Radio Communication*.

RERS195
We were saddened to hear of the death of Eric Trebilcock in South Australia on 7 September. 'Treb' has been the most devoted SWL entrant to the BERU and Commonwealth contests winning the Receiving Rose Bowl many times during the 52 years he has participated in the event. In 1986, the RSGB Council made a special award of a plaque to commemorate his 50th entry in the event and this was presented to him at his home on behalf of the President by G6LX during a visit to Melbourne. The 'Commonwealth' HFCC adjudicators will certainly miss his very detailed and accurate logs.

ROPOCO CONTESTS AND A NEW TROPHY
Our thanks to all entrants who responded to the request for their views about the timing. An overwhelming majority of you prefer an earlier start and finish and this change will now apply. G5MY has generously presented a trophy to the Society which will be awarded to the entrant who makes the highest aggregate score in the two annual ROPOCO contests. (See rules for ROPOCO 1).

Raynet vacancies

There are vacancies for representatives for Raynet in Zone 5 (Greater London), Zone 8 (Wales), Zone 9 (Shropshire, Warwickshire and West Midlands) and Zone 11 (Northern Ireland). These vacancies exist due to representatives reaching the end of their terms of office, except in the case of Zone 9; the representative for this zone has resigned due to work commitments.

Raynet members resident in these zones may forward nominations for their zonal representative to 'The Secretary (Raynet)' at RSGB headquarters. Nominations should be supported by five Raynet members who are currently registered within the relevant zone, and they must be received no later than 5.15pm on Friday 2nd March 1990. They should be accompanied by a declaration from the nominee that he or she is a) normally resident within the zone, b) is a currently registered Raynet member, c) is a member of the RSGB and d) is willing to serve if elected.

Intending nominees are strongly advised to read the guidance notes on the role and duties of a zonal representative before submitting their application. These notes have been prepared by the Raynet Committee and are available either from the Chairman, G3YAC QTHR, or from Membership Services at RSGB HQ.

The period of appointment is normally three years, and existing zonal representatives are eligible for re-election. When more than one valid nomination for a particular zone is received by the due date, an election will be held during the month of May 1990.

Raynet Zone 4 Election

In the August issue a call for nominations for Raynet Zone 4 (Beds, Cambs, Essex, Herts, Norfolk, Suffolk) was made. Two valid nominations were received by the closing date:

Mr R C Rutt, G0AMG, nominated by Mr P G Webber, G8KLC, Mr T Groves, G4KUJ, Miss A Corduroy, G1PRM, Mr T R Hughes, G4WKJ, and Mr A I Cameron, G0EAC.

Mr J W Slater, G6EUO, nominated by Mr J Binning, G3AJS, Mr L O Tostevin, G4PLD, Mr L N Fennelow, G4ODH, Mr S A Deverell, G2FVX, and Mr P A Howarth, G3YAC.

Any current Raynet member registered in the zone may record his or her vote for one of the above candidates in the following manner. No special ballot paper is required. The text of your vote should clearly indicate which candidate you prefer. Please do not include any correspondence in the same envelope. On the back of the envelope, which must be sealed, you must write in block capitals your name and callsign. The envelope must be addressed to 'The Secretary (Raynet Zone 4 Election)' at RSGB HQ. Your vote must reach HQ by 5.15pm on Friday 2nd March 1990.

RSGB Accounts Department

The RSGB financial year runs from 1 July to 30 June. This accounting period determines, on an annual basis, when the accounts have to be audited, approved by Council for publication and published. The timescales are well established; the audit work generally takes place during the months of August/September each year, the late September Council meeting enables discussion to take place and the annual report and accounts are published in the November issue of *Radio Communication* prior to the Annual General Meeting which is held in December.

In the Society the HQ Accountant has always had a direct and special responsibility to the Society's Honorary Treasurer for all accounting matters. Reporting by the HQ Accountant is thus either to the Finance and Staff Committee or through the Honorary Treasurer to Council. The HQ Accountant produces regular written reports to the F&S Committee which are then circulated to Council.

During the 1988/89 financial year the regular accounting reports indicated that the Society would probably break even at the end of the year. During the preparation of the final 1988/89 accounts, senior officials were informed that the Society should make a small surplus. This was confirmed repeatedly until the final audit meeting which took place on 20 September 1989. At that meeting the F&S Committee Chairman (the Society had no Honorary Treasurer at that time) and Secretary were informed by the Auditors that the Society had made a loss. This news obviously came as a shock. On 23 September Council met and the newly appointed Honorary Treasurer reported on the financial results for the year. It was apparent that the system being utilised to report to the F&S Committee and Honorary Treasurer during the year was not producing the required information. As a result it was agreed that a fundamentally new approach must be made in order to enable meaningful reporting to take place. It was agreed to make the in-house Accountant redundant and to employ qualified external Accountants who would have the expertise to produce monthly accounts.

An external Accountant and an HQ Accounts Manager were appointed. During the months of October and November 1989 while new staff and the new external Accountants together took over the accounting functions of the Society, it became evident that some of the RSGB's invoices and bills were being paid late. Most businesses and individuals do not pay their bills on the day they are received, but it was evident that some payments had been made too late and had caused problems. The main problem which was discovered was that it appeared that payments of VAT had been made late and that these late payments had incurred surcharges which then resulted in subsequent VAT overpayments. Other problems were discovered which included late PAYE, staff pension and insurance payments.

At the Annual General Meeting on 9 December 1989 the Honorary Treasurer referred to problems that had been experienced in the Accounts Department. In answer to a question he gave a figure of £8,000 as being the best available at the time as the total VAT surcharge. Since the AGM further detailed work has revealed that the surcharge figure was some £2,800 as a result of three late payments, while the remainder of the £8,000 referred to is in fact an overpayment of some £4,900, which is now being fully recovered. This does not change the validity of the 1988/89 accounts as published.

The Council naturally regrets what has happened. The problems were detected and then, by utilising the expertise of the external Accountants and HQ staff, have been put right. Working with the new external Accountants, senior staff have now reviewed procedures in order to establish better controls. In the future the external Accountants will provide a valuable cross-check on the monthly accounts and reports generated at HQ. The Accountants advising the Society have also helped to evaluate new accounting software and this will be installed during February 1990. Once the new software and procedures are fully operational it will enable better control to be kept of the 100,000 separate financial transactions which the Society makes each year. What is more, efficiencies which arise will lead to cost savings so that more can be spent on services and benefits to members.

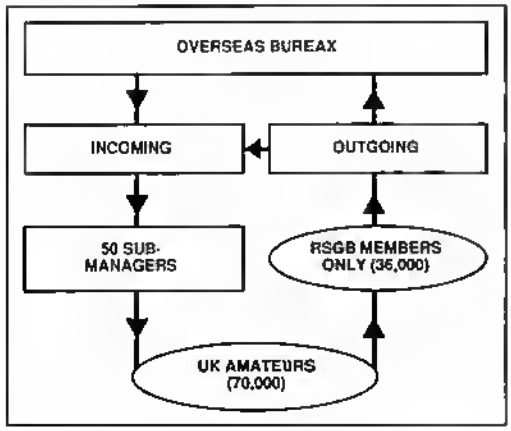
RSGB QSL Bureau move
—Phase 1 completed

The QSL bureau is one of the most popular services provided by the Society. It comprises three parts. Outgoing - these are cards which are sent to the Bureau by UK amateurs for distribution to other countries' bureaux and within the UK. Incoming - cards from overseas bureaux for distribution within the UK. Sub-Managers - those who hold envelopes for sending incoming cards to UK amateurs. These Sub-Managers are volunteers whose enormous contribution to the success of the QSL Bureau is very much appreciated by all concerned with running it.

Until the middle of 1989, the incoming and outgoing sides of the Bureau were handled by Ted Allen, G3DRN, and before 1978 by Arthur Milne, G2MI. Ted was ably assisted his his wife, Aileen. The work involved considerable dedication and lots of space in their own home for parcels and mailsacks full of cards. A weakness of this system, however, was that even QSL Managers have to have a holiday and this resulted in a complete closure of the Bureau for a month each year. cause of a backlog of unsorted cards.

Last year, Ted Allen announced that he wanted to retire and as a result Council decided that a re-organisation was necessary which would include a move of some of the bureau functions to HQ.

By the summer of 1989, Ted's house waa reported to be groaning under the weight of incoming cards, exacerbated by the previous year's postal strike. As a result, Headquarters staff took away aeveral lorry loads of accumulated parcels and sacks and started the unenviable task of setting up an incoming bureau from scratch. Jim Smith, G3HJF, moved from the Membership Services Department to take charge of the bureau work. Jim received much unsolicited and often conflicting advice at this stoge, some from unqualified people and some from those with QSL sorting experience. He decided to go to the experts. Following a briefing from Ted Allen, and a guided tour round Potters Bar Post Office sorting office, Jim was able to set up the Bureau's own sorting office and Ill health could also be a major



How the QSL Bureau works.

started to acquire the necessary expertise, using the time honoured, and extremely effective, method of learning by doing.

One of the difficulties was that there was very little statistical information upon which to base plans. It was known that each year some two and a half million QSL cards went through the RSGB Bureau, but there were no figures available for the percentage of incoming compared to outgoing cards, or how many went out to each sub-manager, or how many cards could be sorted in an hour. And as a consequence it was difficult to assess staffing levels for the HQ Bureau, bearing in mind that there was to be cover for holidays and sickness. It was clear, though, that amateurs were sending more QSL cards, mainly because of the sunspot maximum and the effect of having acquired several new bands in recent years (50MHz, 70MHz for Class Bs, 10MHz, 18MHz and 24MHz). One advantage of the move to HQ has been that statistics are now being produced in order to keep full control of the operation and to ensure it all runs smoothly, even at peak QSLing times.

It was decided that some deterioration in the service had to be accepted in the short term in order to gain in the long term. Short term problems have been delays in getting cards to sub-managers, and a temporary increase in sorting errors. These are just the normal result of a change in working methods. There has been some useful feedback from members and in particular from Sub-Managers which has resulted in a number of changes. For instance, it had been decided that an estimated saving of some £2,000 justified sending cards to Sub-Managers less frequently but in larger parcels. Unfortunately, this led to unpalatable delays for those Sub-Managers who handled relatively few cards, so parcels are now sent to Sub-Managers either at a time limit or a weight limit, whichever is the soonest. No card should be held at HQ for more than eight weeks under this system, and most will be sent out far sooner.

Once Jim Smith had trained himself, he set out to pass his experience on to others, and two sorters are now fully trained and up to speed. The backlog which had been collected from Ted Allen's house was dealt with swiftly by a number of volunteer sorters during the Autumn of 1989. As a result, in a few weeks a whole room full of cards, together with a continuous flow of new cards arriving by post, had been reduced to virtually nothing. Some of these volunteers are continuing to give their time to the Bureau, which is much appreciated. The present strategy is to use several part time staff to man the Bureau under the direction of Jim Smith. The advantage of this is that peaks and troughs in the throughput of cards can be better and more cost-effectively catered for.

There have been rumours of unacceptable delays, dramatically increased sorting errors and so on. There is very little evidence to support this, however. Where minor problems have come to light improvements have been made and the Bureau is now running very smoothly. The incoming side at HQ has at any time no more than 3 weeks work in hand which is a very good figure for a major QSL Bureau. How major? Well, some one and a half metric tonnes of QSL cards (over half a million cards) were handled at HQ during the last four months of 1989! As a bonus, the outgoing side is working better as Ted Allen no longer has to sort incoming cards.

Many Sub-Managers have visited the bureau and have given useful advice. Others have written to explain how the change affects them. Here is a selection of the written comments:

"Many thanks for the letter, really appreciate being informed of what's happening..."

"I did get rather more mis-sorts, but I expected this; in fact it wasn't as bad as I expected... I used to send them back to Ted when a good number had accumulated."

"...the size of the parcel you send is fine for me, in fact they are smaller than I usually get..."

The next phase is to transfer the outgoing side of the Bureau to Headquarters. This will be carried out during the first quarter of this year. Ted Allen's expertise will not be lost however aa he has offered to become a Sub-Manager.

The result of the changeover will be a more consistent service completely independant of staff holidays or sickness, run at approximately the same cost as the old scheme.

Amateurs will always grumble about the slowness of QSL Bureaux systems. Horror stories are frequently told of QSL cards arriving many years after the original contact. The Bureau was never intended to be fast or to replace the postal service; it was introduced as a very cheap way of exchanging cards. Just count how many cards could be sent via the Post Office for the price of the RSGB subscription - not many is it? The way to ensure the best throughput is to follow the guidelines which are sent to every new member and are published in the RSGB *Call Book*. Please be tolerant, patient and understanding. With your help and co-operation the RSGB QSL Bureau should be running more smoothly and efficiently than ever before by the end of 1990.

1989 RSGB Annual Meeting

Why Dunoon?
In 1988 it was decided by the RSGB Council that the Society's Annual Meeting would no longer be held exclusively in London. Following a call for clubs to offer venues, Manchester was chosen for the '88 meeting. This policy proved to be so popular that Council decided to ask again for venues to be offered for 1989. Out of the offers, Dunoon seemed to provide the best facilities at the right price.

Dunoon is on the Southern end of the picturesque Cowal Peninsular just across the Clyde Estuary from Greenock, West of Glasgow. It can be reached by road from the North or by one of two ferries from Greenock. Situated a few miles from the Holy Loch (famous for its submarine base), Dunoon is an attractive small town with mountain views in almost all directions. The sun rising over the mountains in Ayrshire was a stunning sight. One Council member is reputed to have been so impressed that he booked his 1990 holiday whilst he was there!

There has been some criticism of the choice of venue, especially when it became clear that a ferry trip was required for most visitors - however, the ferries were frequent and fast, and could not have been easier to use. The locals, incidentally, appeared to regard the ferries with no more concern than they would buses. Nearly 100 members from Scotland, Wales, England and Northern Ireland made the trip to Dunoon.

The Scottish December weather was also a cause for speculation. However, it was calm and well above freezing thanks mainly to the influence of the Gulf Stream and a stationary high pressure area.

One of the advantages to the Society of the Dunoon offer was its low cost, both for the hall and for hotel accomodation. Dunoon is being promoted as a conference centre and the members and employees of the Argyll and Bute Council went out of their way to make us feel welcome. In fact everyone in Dunoon appeared to be cheerful and friendly and the local paper ran a feature on the meeting.

The venue itself - the Queen's Hall - was a large well equipped general purpose theatre/sports/dance hall with plenty of room for the talk-in station, GB4RS. This was run by the Dunoon Amateur Radio Club who were responsible for suggesting the venue in the first place. A snack lunch and hot drinks were available for those arriving early and the RSGB book stall was extremely popular.

The Annual General Meeting
By 2pm, the start of the meeting, 96 members had signed in. A round of applause greeted the Secretary's reference to Council's decision to select Dunoon for the meeting. The President, Dr Julian Gannaway, G3YGF, then explained the format of the meeting and opened the formal session. After introductions, apologies for absence and an opportunity to examine the 1988 Minutes, the meeting turned to the financial report.

The Honorary Treasurer, Willie McClintock, G3VPK, introduced the Accounts and referred to some accounting problems which had come to light after the financial report had been produced. Questions from the floor centred on these problems. The Honorary Treasurer outlined what had happened and explained that the situation had become apparent only after the Accounts had been produced. Council had agreed at its November meeting that the membership would be informed as soon as all of the information was to hand.

Julian Gannaway, G3YGF, Immediate Past President is seen (above) presenting Basil O'Brien, G2AMV, with his Vice Presidency award and (below) a special award to Sean McWilliams

The President announced the result of the Council election and asked the succesful candidates to stand up to be identified. He acknowledged the fine job done by the election scrutineers led by Bill Craig, G6JJ. Unusually, when the President called for volunteer scrutineers for next year's election there was no response. Fortunately, the 1989 team had already volunteered to do the job again.

There were two formal motions on the Agenda, the first being the re-appointment of the auditors - Moores and Rowland. There was some discussion on this but on a show of hands the meeting agreed to re-appoint the auditors. However, one member, G6JNS, exercised his right to call for a Poll which means that Proxy Votes must be counted along with those voting for themselves in the hall. Since the numbers of proxies held, and their voting preferences, had been printed on the agenda sheet the likely outcome was obvious to all. Nevertheless, it was necessary to carry out the formal procedures which resulted in 2338 votes FOR and 91 AGAINST re-appointing the auditors.

The Extraordinary General Meeting
The second formal motion of the day was an amendment to the Articles of association which sought to close a loophole in Article 26. The intention of this Article is to allow 'new blood' onto Council by limiting Members to two consecutive terms of office. It had become apparent that there was a way in which this could be circumvented. The amendment was carried on a show of hands by 86 votes to 2.

Awards
One of the lighter aspects of the Annual Meeting is the presentation of awards and trophies to those having achieved distinction in amateur radio.

A special award went to Sean McWilliams, who at the age of ten had passed the 12 wpm Morse Test. He was presented with certificates for being the youngest Scot ever to have passed the Morse Test, and the youngest person to have passed a Morse Test administered by the RSGB.

Mr P.Barker, G0DZU, received the Ostermeyer Trophy for his *RadCom* article on the construction of an HF linear amplifier.

The Norman Keith Adams prize for the most original *RadCom* article went to Mr D H Davies, G4YKT, for 'Lifting CW out of the noise.'

Sam Jewell, G4DDK, was

awarded the Worttey Tatbot Trophy for work in Ihe development of high quality designs for the microwave bands.

Ronnie Cowan, GM4SRL, accepted Ihe Raynet Trophy on behalf of the many groups who assisted in Ihe Lockerbie incident.

The Founders Trophy for services lo the Society went to Mr M Harrington, RS20249, in recognition of outstanding work done for short wave listeners and for Ihe HF Contests Committee.

An important facet of amateur radio is the fostering of international friendship. Great achievement in this field is marked by Ihe awarding of Ihe Calcutta Key. This year's recipient was David Sumner, K1ZZ in recognition of his work as Secretary of Ihe IARU. Unfortunately, family illness prevented David receiving the award personally so the IARU Region 1 Secretary, Dr John Allaway, G3FKM, accepted it on his behalf and said "David has asked me to convey to Council and Ihe Society his deep appreciation of the honour which has been bestowed upon him. He is very much aware of the future role of all national societies lo work towards a more positive future within amateur radio in association with the IARU and he has told me Ihat he continues to work lo strengthen Ihe bonds of friendship between radio amateurs in every corner of the globe."

Winners of awards are usually informed a few weeks before the presentation. However Ihe award of a Vice Presidency bestowed on Basil O'Brien, G2AMV, was deliberately kept secret so it would be a surprise. Basil's distinguished membership spanning more than half a century included being a Regional Representative for 25 years, a Council member for 12 years, President in 1981, Chairman of the Finance and Staff Committee and of the Membership and Representation Committee, and Honorary Treasurer. A tireless worker for Ihe cause of amateur radio, he had recently been obliged lo retire from RSGB work owing to advancing years. Obviously delighted with this surprise, Basil said he was not sure which was the greater honour – to receive Ihe award or to have been of service to the RSGB.

Awards Manager moves

The RSGB HF awards manager, Stephen Emlyn-Jones, GW4BKG, has moved OTH and his mailing address is now PO Box 20, Bridgend, Mid-Glamorgan CF31 4JT. Those chasing RSGB HF awards please note.

Following his installation as the 1990 president of the RSGB, Frank Hall, GM8BZX, addresses the meeting.

President's speech

Julian Gannaway, performing one of his last duties as 1989 President, described the major licence revision as the most significant single event of the year, being the culmination of some 5 years work and introducing many new facilities. He then described some of the further improvements lo be made to the licence in the new year.

Work on Project YEAR continued. The video, the first of a series of books and the Novice Licence were about lo come lo fruition. It was up to the members to support the project by training the next generation of radio amateurs. The DTI fully supported amateur radio which provided a training ground for electronic engineers.

The interests of amateur radio were being defended on a number of fronts. The 1992 WARC was being prepared for, an IARU group of radio societies in the European Committee had met lo deal with electromagnetic compatibility regulations, and more effort was being put into tackling antenna planning matters and spectrum abuse.

Within the RSGB there had been improvements, both in the use of modern equipment and in new senior staff. Members could help by encouraging as many amateurs and listeners as possible lo join and support the Society's work.

Finally, Julian announced that the DTI had agreed that two repeaters in remote areas of Scotland could be used for transmitting the GB2RS news. This should improve the service.

Informal Session

A large number of topics were raised by those present. The *Call Book* was mentioned frequently and there was a strong feeling that the GM, GI, GW, GD, GU, and GJ stations should be listed separately from those in England.

GM0ECU wondered why the Raynet Lockerbie report was being vetted by the Authorities. G3YAC, Chairman of the Raynet Committee replied that it was in our interests to maintain a close relationship with the User Services.

GM8BBA asked if it were correct that some repeater groups were not promptly re-imbursing site fees paid on their behalf by the RSGB to the IBA. Staff member, G3XDV, said that some £800 was outstanding and that several groups needed lo be chased very hard. This was, of course, wasting members' money.

One member felt the Society should be concentrating on consolidating its existing services rather than introducing new ones like the Credit Card. The Secretary, G3OUF, described the high work load of HO staff members, many of whom rarely stopped for lunch, and argued that if the Society was to achieve its objectives more money was needed. The Credit Card was a way of obtaining more money without getting it from the membership. This received a round of applause.

GM4VAZ suggested that the Society write to all non-members to try to recruit them. G3OUF said this had already been done with all Class Bs some time ago and a mailshot lo all licensees was planned.

Susan, GM4SGB, protested that those on the top table kept referring to gentlemen when there were several ladies present. The President apologised for this. GM4SGB commented that this sort of attitude could deter women from joining the hobby. To some laughter, the President Elect, Frank Hall, GM8BZX, remarked that not all of the men present were gentlemen either.

GM3EDX started a discussion on HF contests but it seemed that it was impossible lo please everyone or to co-ordinate all contest organisers.

GM8JIP asked why there was not a local advice scheme for those with EMC problems. G4JKS, the EMC Committee's spokeswoman, described a telephone advice scheme which was currently being set up.

Other questions concerned charity status for Raynet, Worldwide Locator maps, the choice of venue, and reduced subscriptions for those on low incomes.

The meeting closed at approximately 6.30pm.

Presidential Installation

After the Annual Meeting, more than 60 guests assembled at a nearby hotel lo celebrate the installation of the 1990 President, Frank Hall, GM8BZX. Amongst those present were representatives of the Argyll and Bute Council, the DTI, the BBC and the IBA.

The event commenced with a drink provided by the Argyll and Bute District Council. The outgoing President, Julian Gannaway, after a short speech, handed over his chain of office. Frank replied with the speech reproduced elsewhere in these pages.

A tradition al presidential installations is a humorous speech by Zone F Council Member Terry Barnes, GI3USS. He explained the difference between Scotch and Irish Whisky, the former being double distilled and the latter triple distilled. He described Frank (who has been known to drink whiskey from time to time) as a triple distilled president as he had been Executive Vice President three times. He presented Frank with a shilletagh "to keep Council in order" an Irish calendar "to prove that not all the best views are in Scotland" and some whisky miniatures. Frank's wife, Beth, received an Irish crystal bud vase.

At last, the dinner was served (a great relief to hungry diners and frantic kitchen staff alike) and all settled down to wish Frank Hall a successful year as President. *(The full minutes will be published in a later edition - Ed.)*

50MHz latest

Just as we go to press we learn that Denmark and Switzerland have now got 50MHz, and more permits are being issued in Sweden. More details next month...

EMC Co-ordinators

Please note that there was an error in the list of EMC co-ordinators which appeared on page 7 of December's *RadCom*. P Fletcher, G8TWD, was included by mistake, so if you live in Zone D please direct EMC queries to the other two co-ordinators for that zone.

Since the last EMC column two volunteer co-ordinators for Zone B have come forward. Those members experiencing EMC problems in Nottinghamshire, Leicestershire, South Humberside, Lincolnshire, Derbyshire, Northants, Bedfordshire, Warwickshire or West Midlands should contact Simon Wood, G4OWI, on 0636 72625, or Sandra Morley, G0MCV, on 0533 374999.

It is encouraging to see a good response to the post card enclosed in December's *RadCom*. It is especially pleasing to see the number of boxes ticked under EMC heading.

Contacting Headquarters

Occasionally members report being confused by the two panels at the front of each *Radio Communication* featuring contact telephone numbers. In summary, the correct phone numbers for the Society are:

RSGB Switchboard (all enquiries) 0707 59015
RSGB Answering machine (evenings/weekends) 0707 59015
RSGB Fax 0707 45105
RSGB Telex 9312 130923
RSGB Telecom Gold 87:COO083
GB2RS 'late changes' answering machine (GB2RS only) 0707 59260
***RadCom* Fax** (*RadCom* matters only) 0707 49503
***RadCom* Telecom Gold** 76:MSX020

The use of the correct number will help to ensure your enquiry is dealt with in the most efficient way. Our main switchboard and its operators are extremely busy so callers are requested to be patient.

Is your school on the air?

The amateur radio society at Warwick school is interested in hearing from other schools active on the air. It already has a regular 21MHz sked with an American school and would like to establish a regular net on Tuesday lunchtimes with educational establishments in the UK, possibly on 7MHz. The school's callsign is G4WKS and anyone interested is asked to contact either Ted, G0KAO on 0926 498851 or Gervald, G0GNF on 0926 613669.

Transatlantic pioneer honoured

On 11 December 1989 a plaque sent by the ARRL was unveiled to commemorate the pioneering work of American engineer Paul F Godley. The text of the plaque reads 'Near this site in December 1921, radio signals transmitted by radio amateurs were first heard across the atlantic. American engineer Paul F Godley selected Ardrossan as a quiet spot for radio reception, and spent several long winter nights in a tent with his receiving apparatus. He was rewarded with confirmed reception of more than 30 different amateur radio stations in Canada and the United States, thus proving that vast distances could be spanned by radio without massive commercial installations.' The picture shows on the far left John McCreight, GM3DJS, honorary president of the Cunninghame and District Amateur Radio Club, and standing next to him is Frank Hall, GM8BZX, the newly installed President of the RSGB. Watching them are Ann and Neil Cowan who own the Abbotsford Nursing Home, the building on which the plaque was erected, and David Evans, G3OUF, the Chief Executive of the RSGB. Every year the Cunninghame club run a special event station, GB2PG to mark Godley's achievement. *Photo: GM4SRL*

BYLARA contest

The seventh BYLARA contest takes place 1900-2200 Thursday 22 February and 1000-1300 Saturday 24 February. Bands are 3.62-3.65 and 3.72-3.775, 7.05-7.09, 144MHz (but not 144.75-145.175 or 145.6-146) and 430MHz (but not 432.8-433.375 or 434.6-434.975). Sections are HF phone, VHF phone and mixed HF/VHF; entrants should spend at least a third of their time on HF and a third on VHF. Submitted entries should show operating time split clearly into 10-minute periods, each of which should be spent entirely on one band. For SWLs, only one period of operation (either Thu or Sat) counts for each entry but more than one section may be entered.

Call CQ BYLARA Contest. Ladies may work both ladies and gentlemen, gentlemen may work ladies only. Exchange callsigns, serial number, name and whether or not you are a BYLARA member for 1989-1990. Score 5 points per YL BYLARA member, 3 points per non-YL member, 1 point per OM. Entries must include signed declaration that licence regulations, IARU band plans and the above rules have been complied with; send them to Mrs Ann Skinner, G0BIR, Halfway Lock Cottage, Upper Gambolds Lane, Stoke Prior, Bromsgrove, Worcs B60 5HB.

QSL 4K0F?

Boris G Surov, UA0QBQ, tells us that QSLs for all contacts with 4K0F must go directly to PO Box 9, Chersky, 678830, USSR. He says 'NOT send via UA1MU and UA1DJ'.

STOP PRESS PCB price rise

Badger Boards have just informed us that they are now registered for VAT; unfortunately this information came too late for us to update the mail order pricelist on page 43 of this month's issue, but the revised prices are as follows:

G4PMK Simple Spectrum Analyser. RF Board £6.11; video/sweep £4.88; marker generator/PSU £4.49; set of all 3 boards £14.38. G3TXQ Transceiver. Main IF/audio £11.50; VFO £5.46; driver/preamp £6.33; low pass filter £7.48; band-pass filter £4.60; control board £5.18; regulator board £2.30; set of all 7 boards £27.03.

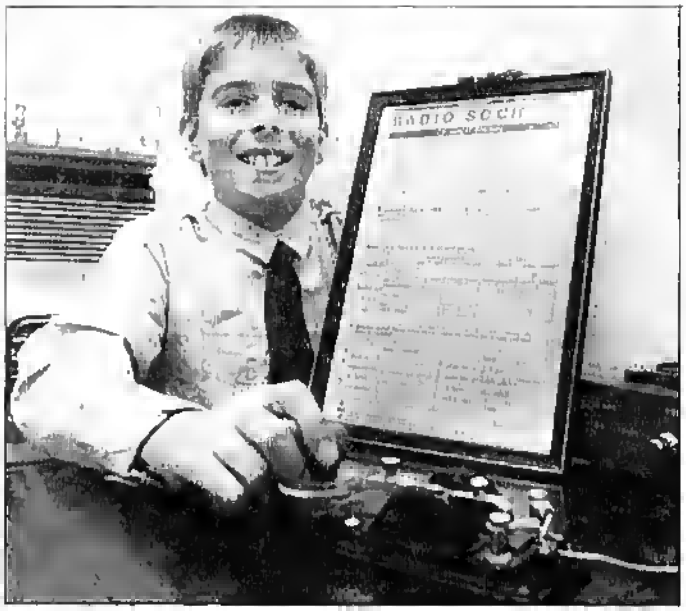
STB on the air

The Scottish Tourist Board (Radio Amateur) Expedition Group - which must be the longest title of any radio-related body in the UK - has asked us to say that the following callsigns were valid during 1989 for the Scottish Thistle Award: March, GB2STB; April, GB2DWR; May, GB2RB; June, GB2RBC; July, GB2NTS; August, GB2SSD; September, GB2NTS; October, GB4SPC. A full list of proposed stations for 1990 is now available from GM3MTH, OTHR, or the Tourist Board itself at PO Box 59, Hamilton, Lanarkshire ML3 6OB.

The Group tells us that they're the most active in Scotland and that they had over 11,000 visitors to their stations during 1989; apparently they know of at least five people who are now studying for their licences as a result of seeing one of the Group's stations. Six separate stations were put on for each event - two on CW, three on SSB and one on FM. We were fascinated to read that the public makes a beeline for the CW stations and takes more interest in that mode than SSB! Quite right too.

'Dual bi-polar power supply'

It would appear that this project, which appeared in the January 1990 issue of *RadCom*, contains a certain number of design deficiencies. Whilst these are not, in themselves, dangerous, we recommend that such a supply should not be used to provide more than 300mA per rail. A suitable alternative design capable of supplying higher currents will be published at the earliest opportunity. Readers are asked to accept our apologies for any inconvenience caused and to note that, as a consequence of the above, the PCB boards will not be available from our PCB service.



Sean sits CW

This pic shows 10-year-old Sean McWilliams from Alva, Clackmanshire, who is probably the youngest person in Scotland to have passed the Morse test. Sean and his father Lawrence (now GM0LWD) attended Morse classes in Menstrie run by Brendan, GM0BWR, and Sean was presented with his framed pass slip on 21 November 1989 by Brian Waddell, GM4XQJ, who is the RLO for the Central Region of Scotland. The presentation was attended by local amateurs and Morse-class students — bet they were encouraged! Congratulations, young sir — pass that RAE next...

What's the Society doing?

A selection of items from the work of the committees

A proposal has been made to place a spread-spectrum navigation system called GEOLOC in the 1.7-2.2MHz portion of the RF spectrum. Amateur radio will become primary user of 1.81-1.85MHz in 1992, and the protagonists of the GEOLOC system propose to incorporate filtering to reduce the level of interference so that amateurs living more than 8km from the transmitters will not be affected. Proposed sites for GEOLOC transmitters are East Anglia, north-east Scotland and the Shetlands.

The Society's HF, Technical and Licensing committees have jointly produced a detailed response to the proposals, which has been sent to the DTI. Briefly, the Society does not agree with the calculations made by GEOLOC's proponents and we believe that the interference will be much more widespread than has been claimed. Certain other technical matters were also raised in the response. At press time the Society was awaiting a response from the DTI.

The European Community group of national societies – of which the RSGB is, of course, a member – met in Brussels in December. One outcome of this meeting is that a proposal is going forward to the European Commission to reduce VAT on amateur radio equipment. This could mean that the EC's share of VAT would be reduced to zero, which would leave the UK with VAT at about 10%. More on this when we have it.

Finally, the Society is producing a detailed response to the DTI on the proposals to implement the EC EMC Directive. As they stand, these proposals could be very limiting to amateur radio, possibly to the extent of preventing the selling of kits which have not been proved to comply with the terms of the Directive. They could also have the effect of preventing modification of equipment.

Nicked

Mr G Tomlins, G1SIZ, tells us that a Yaesu FT727R dual-band transceiver, s/n 7G170009, a Realistic 200-channel PRO-32 scanner s/n 595777 and a Micro 7HT7 430MHz transceiver were stolen from his house in Ashfields Road, Heath Farm, Shrewsbury. Anyone offered it is asked to contact either Mr Tomlins on 0743 58843 or Shrewsbury Police.

Wrong callsign

In the write-up of the G5LO/P operation on page 17 of the November 1989 *RadCom*, we incorrectly quoted G0AEG's callsign as G0AGG. The person responsible has been chastised with whips and scorpions.

Cultural Capital of Europe

The West of Scotland Amateur Radio Society (which has the wonderful PO box number 599) tells us that amateur radio clubs in the Greater Glasgow area have joined forces to celebrate 'Glasgow 1990 – Cultural Capital of Europe' and special-event callsigns will be activated from club premises and cultural events throughout the year. The main callsign for 'Glasgow 1990' is GM90CC, which stands for Nine Zero Cultural Capital and the participating callsigns are GB0, 2 and GB4CCE (Cultural Capital Europe) and GB5 and GB6CC (Cultural Capital).

In connection with this event, there's a splendid prize draw to try for. The top prize is a seven-day trip to Glasgow, with return air fares for two from the winner's country (donated by the Scottish Tourist Board), hotel accommodation in Glasgow (donated by the Greater Glasgow Tourist Office) and complimentary tickets to a variety of events taking place during the stay. A secondary prize consists of two seven-day 'Freedom of Scotland' rail tickets (donated by ScotRail) will be offered to an entrant and partner who intend to visit Scotland during 1990.

To enter, you must have *one* contact with GM90CC on any band and mode, plus *four* contacts with any of the callsigns mentioned above. Send the QSL for the contact with GM90CC either via the bureau or direct to PO Box 599, Glasgow G1 1EW, Scotland, and quote the other four stations you have contacted on your QSL card. Please do NOT QSL individual GB callsigns involved in this event unless requested to do so by the station. Your card will be entered for the draw, which will take place on 1 May 1990.

If you'd like your card to be entered for the secondary prize, please write 'Flying Scotsman' on your card. The draw for this will take place on 1 June 1990.

More information is available from co-ordinator Allan Buchan, GM0EFH, at 14 Jordanhill Drive, Glasgow G13 1SA.

Lockerbie crash honours

Further to the piece last month about the Lockerbie tragedy, we were delighted to see that Alexander Anderson, GM4VIR, the group controller of Dumfries & Galloway Raynet was awarded the MBE in the New Years' Honours List in recognition of his work during its aftermath.

Loadsamoney for Ayrshire Raynet

Ayrshire Raynet Group has been successful in obtaining a grant of £900 under Strathclyde Regional Council's development committee grant scheme. The group had its sights on a heavy-duty mobile mast, capable of extending to over 50', at a cost of around £1,500 and had already raised over £500 in the form of donations from local firms – including £250 from the Prestwick offices of British Aerospace. The regional council's donation has allowed the Group to take delivery of the mast – from Tennamast in Beith, Ayrshire – much sooner than they had thought possible.

The group committee are to be congratulated on the positive way they tackled the problem of not having a suitable mast. Grants of this type are often available, and it's good to see that the Ayrshire group were able to make a good case to the regional council.

The photo shows group controller Tom Stewart, GM0BKX, receiving a cheque for £250 from Mr John Larroucau, Senior Vice-President of Jetstream Engineering, British Aerospace at a recent ceremony held in Prestwick. Mni tnx to Raynet committee press officer Ronald Cowan, GM4SRL for the pic.

New products

First off the heap is **Nevada**, who are importing the Fairmate HP100E scanning Rx. According to the press release, this has '...the highest specifications yet seen in a handheld scanner anywhere in the world. Its main features are frequency ranges of 25-550MHz and 850-1300MHz with 1000 memories *(that's one thousand - Ed)* three selectable receive modes, selectable receive attenuator, keyboard or tuning knob frequency control... and programmable search steps'. Nevada added that 'Fairmate are a major Japanese company who are virtually unknown in the UK. For many years, however, they have produced models for famous brands such as AOR and Regency. The HP100E will be the first product released in Europe carrying their own name... it will sell at £299 inc VAT'. Sounds like an awful lot of technology for a handheld receiver, doesn't it? Nevada are at 189 London Road, North End, Portsmouth, Hants PO2 9AE, or ring them on 0705 662145 - fax 0705 690626.

Members in the Tyne & Wear area may like to know that **Star Electronics** has been appointed the authorised dealer for Yaesu and SMC products and the northern distributor for Revco antennas. Star also stock MET antennas, Howes kits and other things. Star said that 'There's easy access from all major roads with free parking, and we're located very close to Hebburn Metro Station'. Great stuff - check them out at Unit 5c, Robert Frazers Industrial Estate, Station Road, Hebburn, Tyne & Wear NE31 1DB or give them a ring on 0836 293738. They also sell RSGB books, by the way, which has just got to be the best reason for going to see them.

'ATV Master: An Integrated SSTV and FAX System for the Commodore Amiga Computer'. So ran the title of the latest press release from **ICS Electronics Ltd.** Not so much a press release as a mini-essay on the unit, ICS say 'Until now, STV has demanded either expensive dedicated commercial equipment from companies such as Robot or Wraase or a complex home construction project in order to produce reasonable results. Even then, if the signal was not absolutely perfect, large areas of the picture could be lost and colour registration ruined. For only £299.95, AEA Inc has provided the answer. We can now provide an add-on interface box and software which will make the humble Commodore Amiga computer into the most powerful SSTV and FAX transceive system ever.' There's much more in this vein, but we'd suggest that those interested ask ICS Electronics for a copy of the extremely detailed and comprehensive information. They're at Unit V, Rudford Industrial Estate, Ford, Arundel, West Sussex BN18 0BD - telephone 0903 731101, fax 0903 731105.

Would you like a QSL card drawn for you in the style of R F **Byrne** and his friends? If so, write to Paul Thompson, G6MEN, at PO Box 32, Shrewsbury, SY1 1ZZ with a rough idea or description of what you have in mind and a cheque for £10. For printing of your cards, in any colour ink on gloss or matt card, Paul recommends **'G4TJB QSL Cards'** who are at 29 Portishead Road, Worle, Weston-Super-Mare, Avon BS22 0UX. Paul sent in some sample card drawings, which unfortunately we couldn't reproduce here for technical reasons; no doubt he'll be pleased to let you have some examples of his work. Two 'off-the-shelf' designs were available at half-price, incidentally.

Talking about G4TJB reminds me that this company are the trade and retail distributors for the **'Navy Special'** mobile whip antennas, made by Tony, GW4YYY. There are two basic types of these - Model A which covers 7, 10 and 14MHz and Model B which does 18, 21 and 24MHz. Power handling is 100W PEP, and having been admiring one of these antennas only the other day I can testify that they're jolly well made and work well too. Both cost £52.95, although you need to buy your own mount (magmount, gutter, boot lid, etc). 'G4TJB QSL Cards' are at the address mentioned above, although they were supposed to be moving to a new one in mid-January. When we spoke to them on the phone the other day they hadn't signed the contract for the new place yet and weren't sure when they'd be going. However, they'll be picking up phone calls on the old number, so we'd suggest trying that prior to sending anything through the mail. They're on 0934 512757.

Having published a little item about the **Samson** ETM-SQ twin paddle key the other month, we had a couple of letters saying how good they were. One of them said 'why don't you get G5BM to tell you about the other Samson keyers, they're really good' or words to that effect, so we did. In reply, Frank wrote a very interesting letter which unfortunately is a bit long to publish in its entirety here. He said 'Samson keyers have been popular with seagoing radio officers for many years because of their portability, being completely self-contained with long-lasting batteries and integral paddles... the versatility of these keyers, having both reed-relay and transistor keying outputs, makes them suitable for use with any type of transmitter or transceiver that the operator may encounter. Models with heavy-duty reed relays are also available for use with the older types of high keying-current transmitters.

'The current range of Samson keyers is the ETM-1C, ETM-5C and ETM-8C. The ETM-1C is the bottom of the range; it is a basic iambic keyer which requires external paddles. The most popular Samson models are the ETM-5C and ETM-8C; they are similar in appearance but the 8C has 8 memories with a capacity of 512 bits each, which is adequate for various types of CQ calls, name and QTH, etc. Prices are as follows: ETM-1C, £36.00 plus £1.15 p&p; ETM-5C, £88.00 and ETM-8C, £144.00, with p&p on the latter two being £2.80. The ETM-SQ is £36.00 plus £2.70 p&p. Please note that the price of this later model has increased from that given earlier as a result of the deterioration of the £ against the DM.' Quite so; West German products are noticeably dearer than they were a few months ago.

Frank says that he'll be delighted to answer any queries from members about Samson keyers; ring him on 0531 820960 or drop him a line at Woodland View, Birches Lane, Newent, Glos GL18 1DN.

Still on the subject of keys and keyers, we had a letter the other day from Gordon Crowhurst, G4ZPY - proprietor of **G4ZPY Paddle Keys** who were mentioned in these pages a while ago. Gordon said that he'd introduced yet another key to his range, actually the 25th; he wrote 'This key, displaying our usual high standard of British craftsmanship, is a satin-finished pump (straight) key in kit form. Based on the Marconi "American Wireless Key" it incorporates a new form of spring tensioner and can be assembled ready for use in fifteen minutes. The key can be purchased for £19.95, or £27.95 with a polished mahogany wood base'. Gordon added that they wouldn't be selling the key ready assembled but '...even purchasers with the smallest amount of engineering knowledge can assemble it'. Sounds very good - G4ZPY Paddle Keys are at 41 Mill Dam Lane, Burscough, Ormskirk, Lancs L40 7TG, and on the other end of 0704 894299.

Barker & Williamson - now there's a name to conjure with. Old-timers and not-so-old-timers will know that since 1932 B & W have had an excellent reputation for superb products, which consisted of more or less anything to do with Inductors. They're still very much around, and we were delighted to hear from RF Engineering Ltd (prop G4JAG) that they've been appointed the UK distributor. They say 'We intend to service both the amateur and commercial market, and we will be at many rallies in future months'. The catalogue they sent along looked good, with a pic of a FB HF linear amplifier containing a couple of 3-500Zs on the back cover. Get your copy from RF Engineering Ltd at 2 Elizabeth Drive, Helmshore, Rossendale, Lancs BB4 4JB.

Top: Fairmate scanner

Right: Samson ETM8C keyer

"They do say some silly things over the air," murmured Aunt Sandra

Jack Hum, G5UM

SCENE: The upstairs radio room of the Ancient Mariner (hereinalter called TAM) with its prospect of distant hills and a church spire illuminated with the sunshine. Bounding up the stairs comes Young Electronic Person (hereinafter called YEP), full of news about his attempts to become a radio amateur.

YEP: Thanks for letting me sit in with you again. I'll always remember that last session we had when we scoured what you called the HF bands... but I was a bit mystified why they call that 160-metre band 'Top Band.' Shouldn't it really be bottom band?

TAM: Strictly, you're right, YEP; but the term was applied all those years ago when hams talked in terms of wavelength and not in frequency as they do today. Nothing much wrong with the term 'Top Band' is there?

YEP: Hmm, I suppose not... I hear misnomers every day when I tune around the bands. I hear a lot of other things too. When I was sitting in with my Aunt Sandra's husband a few weeks ago... I can't remember his callsign...

TAM: *(with a grunt)* You jolly well ought to at your age.

YEP: Well I don't... must do some revision! As I was saying, my Aunt Sandra hears a lot of what goes through her OM's radio, and last time I was with them, she said to me "You do hear some silly things said over the air." She wasn't at all critical of her husband's ham radio hobby but she seemed to think that a lot of what she heard was either unintentionally funny or just plain daft.

TAM: She was right, you know, YEP. Do you remember some of those daft things we heard on the 80-metre band when you were here last?

DREDGE AROUND THE METREWAVES

YEP: I'll never forget them. But what's it like on VHF? You said *last* time that *next* time we could have a dredge around the metrewaves.

TAM: Yes, let's do that. Have the *Callbook* by you so you can look up the callsigns you hear and tell me where to turn the beam.

YEP: The *Callbook*... it's pretty fat these days, isn't it! I remember a man writing somewhere or other that it's the metrewave person's best friend after the Licence. Right, TAM, where do we start?

TAM: We'll start with a twiddle round the 2-metre band... now here's a quick-fire contact... those two blokes know how to operate... listen how they pass it back from one to the other, just like face-to-face speech.

YEP: Yes, they're good. But what's all this about 'rabbiting on' which you mentioned last time I was here?

TAM: Oh, that won't be difficult if we latch on to the local repeater. Now, *here's* a familiar callsign coming through 'the box'. Look him up in the *Callbook* and also look up the chap he's talking to.

YEP: Yes, here they are...but TAM, look at this: they're both in the same postal code district! Do they really need to talk through a repeater to make contact?

TAM: No, they don't, and it's a damnfool way (if you'll pardon my French) of carrying on a contact. Each should check if he can hear the other on the input, and if he can, then there's absolutely no need to use a repeater. Anyway, it's not a real QSO when you talk to one another through a repeater.

YEP: Can I take you up on that with all the diffidence and respect a Young Electronic Person can summon up?

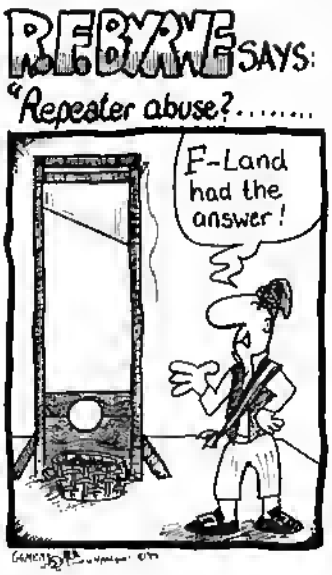
TAM: Sounds as if you've swallowed a dictionary...but go on.

YEP: I've just been thumbing through the pages of the *Callbook* where it gives the Q-code, and it says here that 'QSO' means communication either direct or via a relay link.

TAM: That's quite right...but you'll find that the Q-code, although expressed in adjectival terms, lends itself to modification as a noun.

YEP: Cor' now *you've* swallowed a dictionary!

TAM: *(unheeding)* You could say that a QSO *is* a noun which every ham puts in to his vocabulary, and if he has got any sense at all, he realizes that a contact made through a repeater isn't a real QSO. It's an assisted one, and doesn't rate for claiming an award. Hold it... listen to this... here's a G-ham talking to a Dutch one through a repeater on the East Coast. Did you notice that each said to the other "my QSL sure"?



YEP: On that reckoning, neither of the QSLs they swap will be valid.

TAM: True... but to talk foreign is something few metrewave operators have a chance to do, and so it's quite exciting to them when the DX is coming through even if a repeater is doing the work. After all, how they choose to use their QSLs is *their* business, isn't it?

YEP: But after what you said, aren't they wasting precious QSLs doing just that?

TAM: Of course they are...but as I say, they are free to do so if they want.

'THIS QSL BUSINESS...'

YEP: Now, about this QSL business: I often hear hams ending their overs with 'QSL' every time they go back to the other party. Does this mean they want a QSL card? I don't think so, 'cos they say 'QSL' after each over. Explain, please, TAM.

TAM: The accepted way to pass it back is to say 'OVER'. Someone somewhere discovered that 'QSL' means 'acknowledgement' and so the habit has spread.

YEP: A bit pretentious, isn't it, TAM?

TAM: Yes, as pretentious as that other buzz-phrase you hear bandied about, "I'll give you a bell." Last week when the insurance man was here, he said to my missus that he'd give her a bell after he'd sorted a few things out. I'm afraid my rather outspoken missus replied that she didn't want a bell; she already had two on the front door and another up in the radio room so that she could summon the OM when his lunch was ready.

YEP: But don't buzzwords make the language more interesting?

TAM: Up to a point they do, but past that point they become irritating clichés.

YEP: Ha, ha, I can tell you one of them...that awful phrase you hear in television interviews "how do you feel about so-and-so." it's enough to make a distressed person seize the mike and throw it into the interviewer's face.

TAM: That probably happens, but of course the television people don't show that bit. But let's get off television and back to ham radio; it's much more interesting.

FULL TALK-THROUGH

YEP: It certainly is. Now here's something very, very interesting. This FM chap on 144.8 is having a one-sided contact. Is this what you call duplex?

TAM: Correct again, young lad, and it comes in two forms, in-band duplex when both of you talk on separate rigs in the same band, and cross-band, say, from 2 metres into 4 metres or 70 centimetres... 'seventy' for preference.

YEP: You are a bit confusing when you say 'seventy'. Do you mean 70cm or 70MHz?

TAM: If I didn't know you so well I'd call you a nit-picking bathbrick... Of course I mean 70cm.

YEP: Still sounds slightly confusing to me... but can we go back to this chap using duplex? It sounds very interesting.

TAM: It is indeed. You could say of duplex that you can pass more information this way than by any other except packet radio, and it's much quicker than packet, and it does have a human voice!

YEP: I could detect an exclamation mark after that last sentence, TAM.

TAM: When you do duplex you must never let the other operator's callsign get through *your* mike, and you should both announce at regular intervals which band you're using.

YEP: What regular intervals? Does it say so in the Licence?

TAM: Yes, it does, but I'm blowed if I can remember...

YEP: Well, I'll tell you: fifteen minutes. At any rate, that's what they told us on the RAE course. Haven't you read your licence lately, TAM?

TAM: Er... I can't say I have. I ought to do a bit of genning-up. Thanks for the hint, young man.

YEP: I wish you wouldn't keep calling me 'young man': I hope to be an OM before I'm very much older! Now, what's that buzzing noise at the bottom end of 'Two'?

TAM: That's meteor scatter... a chap sending very fast morse to get through to another chap far beyond the normal range of the metrewaves. Each of them may need to wait for an hour or two before getting the final 'R'.

YEP: But if a QSO is that minimal, is it really worth having?

TAM: Indeed it is... the Everest Syndrome prevails. They do it because it's there and it's a challenge to their operating skills. What's more, they are real QSOs.

YEP: Then those QSOs through satellites aren't real QSOs. After all, they ARE through a repeater, aren't they?

TAM: Hmm, you've a point there. Let's go back to something simple.

YEP: Yes, the local repeater for a few minutes... phew, what nonsense! I'm sure Aunt Sandra would feel pretty sick if she could hear some of *this* rubbish, and why does that bloke keep guffawing at his own jokes?

TAM: Habit dies hard, I suppose...but indeed it *is* rather sickening.

YEP: It's amazing how much you can learn just by listening.

RSGB 1990

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SPECTRUM ANALYSIS

HF

JOHN ALLAWAY G3 FKM

AWARDS

The DARC 40 Award

DARC, the amateur radio society of the Federal Republic of Germany was founded at the Bad Homburg short-wave radio conference in 1950. This award celebrates their 40th anniversary and is available to both licensed amateurs and listeners. It is for working/hearing West German club stations (prefixes DF0, DK0, DL0, and DA0) during 1990. Applicants must not include more than three DA0 stations - if claimed one of each must be on the HF, 144 and 430MHz bands.

Forty points are needed for the award and each QSO counts as follows (for applicants outside the FR Germany): HF - telephony = 2, CW = 4, other modes = 6, and with a DA0 station = 10. On 144MHz the figures are 4, 6, 8, and 10, and on 430MHz they are 6, 8, 10, and 10 respectively. Awards will be numbered serially. To apply send log extract plus DM15, US$8.00, or 12 IRCs to: DARC Amateurfunkzentrum, DARC 40, PO Box 1155, D-3507 Baunatal, F.R.Germany. *Note that all proceeds from this award will be given to AMSAT-DL for the development of amateur radio satellites.*

Vasteras 1000 Years Celebration Award

For contacts with Vasteras stations during 1990. Europeans outside Sweden need 1000 points, and each QSO with a Vasteras station counts 50 points. Listeners need confirmed reports from ten stations in the city. Send log extract (certified by two other amateurs) before 31 January 1991 to Award Manager, Vasteras Radio Club, Box 213, S-721 06, Vasteras, Sweden. There is no charge other than that of four IRCs for postage. Vasteras is in SM5, and I can supply a copy of a list of stations located there together with the official application form.

Luxembourg Independency Award

There are some changes to the rules for this and it is now necessary to send a confirmed log-extract only. The closing date for QSOs is now 31 December 1990 and the deadline for applications has been removed; awards will continue to be issued as long as stocks last. 150 points are needed - each LX worked counts ten points and QSOs with LX0RL and LX150L count 15. Each station may be counted once only on each band irrespective of mode. Send detailed list of QSOs plus US$6 or 10IRCs to RL Awards Manager, P.O.Box 1352, L-1013 Luxembourg, Luxembourg.

Z2 Award

Available to licensed amateurs for contacts with Zimbabwe stations, and issued by the Zimbabwe Amateur Radio Society. Requires five contacts on any band and any mode. Send certified log extracts plus US$1.00 or 10IRCs to Z2 Award, PO Box 2377, Harare, Zimbabwe.

CONTESTS

PACC Contest

1200 10 February - 1200 11 February

1.8 to 28MHz - CW and SSB but no cross-mode, in band sections following the IARU Region 1 bandplan and confined to contest-preferred segments where these exist - i.e **CW** 3.5-3.56, 14.0-14.06MHz, and **SSB** 3.6-3.65, 3.7-3.8, and 14.125-14.3MHz. Note that only CW QSOs are allowed on 1.8MHz and that these must be made between 1.825 and 1.835MHz. Single and multi-operator. Exchange RS/T and serial number (from 001). Dutch stations give two letters to show their province - these are GR, FR, DR, OV, GD, UT, NH, ZH, FL, ZL, NB, and LB. Multipliers are the provinces worked per band (maximum 6 x 12 = 72). OSOs count one point. Logs must be posted within 30 days of the contest. I can supply photocopies of the rules - SASE please. In the **1988 PACC Contest** **G5LP** scored 15,360 points, G3ESF 13,090, G4IQM 12,645, G2HLU 11,970, G3AEZ 9,204, G4ZIB 5,868, **GM3KLA** 5,544, **GW0HPQ** 5,247, G0CYL 2,574, G0/PA3ARW 765, and G0AOL 72. RS87156 scored 1,521 points in the SWL section.

1990 ARRL International DX Contest

0000 17 February - 2400 18 February (CW)

0000 3 March - 2400 4 March (Phone)

Classes - (A) Single operator single and multi-band. (B) Single-operator assisted, single and multi-band (this allows the use of spotting nets etc). (C) Single-operator QRP (5W output or less) - this category is multi-band only. (D) Multi-operator single, two transmitter, and unlimited. 1.8 to 30MHz excluding WARC bands. Exchange RS/T plus a three-figure number indicating power output. W/VE stations in contiguous US states and Canadian provinces (excluding St.Paul and Sable Is) send report plus province. Each QSO counts three points and the multipliers are the sum of US states (except KH6 and KL7) plus DC, VE1-VE8, VD, and VY1 worked on each band (a possible 59 on each band). Stations may be worked once per band and cross-mode OSOs do not count. Use ARRL International DX Contest forms (available from 225 Main St, Newington, Conn, 06111, USA - please include IRCs for postage). Entries may also be sent in on diskettes as an ASCII file. I can supply photocopies of the full rules which also give instructions on diskette log entries. Note that all entries must be postmarked no later than 30 days after the appropriate contest.

28MHz COUNTRIES TABLE

G4MUW	209
G0IHB	206(ssb)
G0CKP	194(cw)
G4ZYO	183
G4DXW	179
GM4ELV	158(qrp)
G4NXG/M	150
G0FWX	141(ssb)
G0JSM	135
G0JHC	135
G4XAH	134(ssb)
GM4OBK	132
G2AKK	125(cw)
G4OBK	115
G0BXD/M	109
G4SJG	101
GD4XTT	98
GM4CHX	84
G3SDK/M	54

Next month will show the final 1989 totals and the first 1990 scores will appear in April.

LESOTHO

Latest information on amateur radio in **Lesotho** has come in a letter from Gervais, 7P8DR (G4URJ). He reports that the 10, 18, and 24MHz bands have recently been released and that 7P8EL has already been busy on them. Gervais himself prefers AMTOR and RTTY, mostly on 21MHz, and is busily preparing himself and others for packet. He is the only active 7P8 on the mode but Ed, 7P8DX, should join him soon.

DX NEWS

Rumours continue concerning possible operation from **Bhutan** and one of the more recent involves VU2WAP, who is said to be visiting there now and investigating future prospects. Another is that the king of Bhutan has now authorized amateur radio in the country. However, in an HIDXA bulletin, Jim Smith, VK9NS, reports that he has recently discussed the position with VU2JX by telephone and that the latter said that no approach had been made to the Bhutan authorities at this stage. Jim believes that any idea of a multi-operator expedition to A5 is unrealistic - at best it might become possible to get permission for two or three operators but even this is not a current option. He says that at the present time there is no problem with financing a visit should this become possible. XW8KPL seems to like list operating and has been on 14.165MHz in the mornings. This is a club station installed thanks largely to the efforts of JA1UT and the operators are employees of the Khao San Pathet Lao newspaper. Other club stations in **Laos** may come on the air soon.

F6EBA is currently on **Mayotte Is** as FH5FJ and will be there for two years. He has been heard around 1700 near 28.028MHz. 5U7NU is Alain, formerly XT2BR, who should be in **Niger** for several more months. **TL8PN** is a missionary from the Netherlands and should be found most days around 1200 near 21.345 or 28.345MHz. 3X1SG, in the **Republic of Guinea** is reported by the *Long Island DX Bulletin* to have a good signal around 28.683MHz on Sundays at 1400 and on other days near 21.3MHz from 2130. ZS1IS in **Walvis Bay** has a new callsign — ZS9A - and is said to be available on Mondays, Thursdays, and Sundays on 28.61MHz after a schedule he keeps at 1615.

DX News Sheet reports that PA3CXC is planning a visit to **S.Sudan** and is reported to have signed an agreement with the Sudan Military High Command and received permission to operate as 6U0CW and 6U0DX sometime between late this month and early April. He hopes to have two stations on the air for 24h daily and he may have F2CW and VK9NS helping him. The expedition will be used to help raise funds for the local people and for this reason *all* OSLing will be direct and donations will be solicited.

The same news source also gives information on some special events taking place on **Pitcairn Is** during 1990 to mark the 200th anniversary of the island's settlement by the *Bounty* mutineers. Nine operators

QTH CORNER

BV2DA	DL7FT, Box 1421, D-1000 Berlin 19, FR Germany.
HC8U	W6UE, Caltech ARC, Cal Inst of Technology, Pasadena, Ca, 91125, USA.
JW9XG	LA9XG, T.Roghell, Asovn 14, N-8200 Fauske, Norway.
T32BO	WD5F, Rte 6, Box 182, Weatherford, Tx, 76086, USA.
XT2KG	Yasme Foundation, PO Box 2025, Castro Valley, Calif, 94546, USA.
XW8CW XW8DX	ARS XW8OX, Box 67, F-06140 Vence, France.
XW8KPL	Mr Inh Siphacchanh, Deputy Director General of Khao San Pathet Lao, PO Box 310, Vientiane, PDR Laos.
XW8KPV	via JH1AJT, Y.Z.Miyazawa, 24-11-2 Tamagawa Gakuen, Machida 25, Japan.
7P8EL	Box 521, Maseru, Lesotho.
9K2KS	ON7LX, Zeedijkweg 3, B-8021 Loppem, WV, Belgium.

on Pitcairn may use special callsigns - VR200Pt/xx - where the 'xx' is the normal suffix of the operator's callsign. A single VR6 QSO during 1990 enables you to claim a certificate, and if it is with someone using the special prefix a gold endorsement will be added. Special application forms are available from DXNS, 123 Reading Rd, Finchampstead, Wokingham, Berks RG11 4RD, in exchange for two first class stamps (UK) or three IRCs (elsewhere). *DX News Sheet* notes that there is a new station on **Johnston Is**. This is KE2AA/KH3.

There is a rumour that a nine-day expedition to the **S.Sandwich Is** may be under way early this month. The callsign given is VP8BZL and the operators said to be some of those who took part in the US expedition to Bouvet Is. The callsigns fisted are WA4JQS, W9ARU and XE1UIC and may include some others. The S.Korean base station HL5BDS in the **S.Shetland Is** was due to close down last month and his replacement is HL8KSJ.

The ARRL Awards Committee has accepted the DXAC request to add **Conway Reef** (3D2), and **Banaba Is** (T33) to the DXCC Countries list. They will count with effect from 1 March 1990 and QSLs should not be sent in before that date.

It is understood that stations in **Estonia** changed their prefixes to the ES1-ES0 series as of 1 January 1990.

PROPAGATION

Once again the G8KG report makes very interesting reading and goes as follows: "The closing months of 1989 will have given newcomers a first impression (and old-timers a happy reminder) of how the HF bands behave towards the peak of a high solar cycle. The most recent spell of high solar activity continued throughout November and the first week of December, but there was then a fairly steep fall. During that spell the 10.7cm solar flux remained above 200 SFU for 40 days including the whole of November - the first month in this cycle to reach this level, although the average for the month was only 234 SFU, lower than in both January and June. As of 21 December the 27-day running average had been mostly above 200 SFU for 130 days.

"For readers who wish to up-date the graph which appeared in the November issue, the values for months 36 and 37 are 217 and 223 respectively (note that the figure of 230 on the vertical side is a misprint for 220!). It can be seen how very much higher the solar activity has been during the past year as compared with the corresponding period of the previous cycle, and that the 3-month mean flux centred on month 37 is higher than the *peak value* of Cycle 21 and just above the corresponding value in Cycle 19.

"These rankings are also to be seen in the smoothed values. The latest smoothed monthly mean solar flux, that for May (month 32), is 209 SFU, higher than for any month in Cycle 21 and above the value for month 32 of Cycle 19. It must be said, however, that both the 3-month mean and smoothed monthly sunspot numbers show the present cycle ahead of the past one but somewhat behind Cycle 19.

"The data available at the end of the year do not yet indicate what the final outcome will be. Predicting forward from the most recent smoothed values and assuming a peak in the first quarter of 1990, a top smoothed monthly flux of around 240 SFU and/or a corresponding sunspot value of 180-190 look quite likely. The current smoothed values are, however, still to some extent distorted by the very high monthly values reached a year ago. This means that the above predictions require that the solar indices will start to rise rapidly in 1990. Such behaviour is normal at the cycle peak and the steep climb to 272 SFU by 25 December suggests that it may already have started. It, however, the December lull is prolonged the smoothed curve will begin to level off and the timing and height of the peak will become less certain..."

BAND REPORTS

The rather early deadline caught out a few but the quality was there if not the quantity! Thanks to G2s AKK, HKU, GM3CSM, G3s GVV, LPS, G4DXW, GW4KGR, G4s MUW, NXG/M, GM4OBK, and G4ZYQ. Calls in italics were of stations on A1A.

1.8MHz

2000 *LX7A, 4U0ITU*

7MHz

0100 PYQFF, TA1AZ.
0200 *FG5R.*
0300 A92BE, *TU4DT, US1GB.*
0400 *PA0GAM/ST2, YW1A.*
0500 *NL7G, P40GD.*
0700 *V31BB.*
0900 *N5VV*(N.Mex), *UB5MAL/UA1O*(Novya Zemlya).
1000 *PJ7A.*

HF F-LAYER PROPAGATION PREDICTIONS FOR FEBRUARY 1990

The time is represented vertically at two-hour intervals 00(00)GMT for each band, ie 00=0000, 02=0200, 04=0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz colums.

Time / GMT	28MHz 0000011111122 02468024680 2	24MHz 0000011111122 02468024680 2	21MHz 0000011111122 02468024680 2	18MHz 0000011111122 02468024680 2	14MHz 0000011111122 02468024680 2	10MHz 0000011111122 02468024680 2	7MHz 0000011111122 02468024680 2	3.5MHz 0000011111122 02468024680 2
++ EUROPE								
MOSCOW	....7++90...	....999992..	...1999995..	...48888981.	1..7776789952	7636544460998	80442113688	+53.....3++
MALTA	....8+9904..	....999996..	....9999992.	...28088995I	33.776678995	084753346899	99652111468	+++2.....4++
GIBRALTAR	....386884..	....599996..	....8999992.	....9888995.	12..87778994	774573446899	99874211368	+++5.....3++
ICELAND	.....37871..	.....68983..	.....89997..	....2989992.	.1..78778972	662175556897	86765322468	+++42....35+
++ ASIA								
OSAKA	....66.....	....871.....	...1872.....	...2863111..	1..163223413	....31.13665	....1...1462	.........4.
HONGKONG	...18-84....	...269861...	...1677741..	....465663..	1....13236741	2.....13706	1476	243
BANGKOK	...3++++8...	...3698991...	....1377794..	....165687..	2....3236854	4.....3708	2.....1477	244
SINGAPORE	...378898...	...3688891...	....1377794..	....1656871.	2....3236854	3.....3707	1.....1476	243
NEW DELHI	...4+++92...	...468084...	...335777....	....1133681..	3....236544	73.....3708	62.....1477	3.........245
TEHERAN	...5++++81..	...7778992...	...7446795..	1..621568821	5123..236875	864.....3708	861.....1477	53........244
COLOMBO	...4++++81..	...4578993...	....2146797..	2568821	41....236875	72.....3708	5.....1467	2.........235
BAHRAIN	...5++++82..	...7668895..	...63267982.	2..41.468942	6321..136887	973.....3708	861.....1376	33........243
CYPRUS	...3++++95..	...5999971..	...6878993.	21.876788763	7327534579?7	99642.135799	8852....2587	++2.....254
ADEN	...5++++961.	...6557878?.	1..521479962	41.3..158785	8531...26898	983.....3708	861.....1476	33........43
++ OCEANIA								
SUVA/S	.....4773...	.....6885I..	....277784..	....4666861.	...16433671.	...341..34..	...11...11..	.....
SUVA/L	21..643111374	21..86532574	12.186545762	..1385346?3.	..1362115?1.	...33...33..	...11...11..	.....
WELLINGTON/S	....27765...	....48077....	....787783..	...1865685..	...36423661.	...141..134..	....1....11..	.....
WELLINGTON/L	1...2.....1	21..42....22	221.741..243	.11.84212441	...26211462.	...23...23..	....1....1..	.....
SYDNEY/S	...297787...	...3988881..	...4877893..	...2863686..	....5323683.	....3..1374.	.....141.	.....2..
SYDNEY/L	....221....12	....4421..34	....6642116?	76433474	....6312476I	....31..263.	....1....3..	.....
PERTH	...#887761..	....4788683...	...2476786...	....2556682I	2.....2236074	 3785	1472	.....24.
HONOLULU	..... 3..	..... 5..	..... 172.	.1...111.272.	.12142215?..	..4541..33..	..251....	....2.....
++ AFRICA								
SEYCHELLES	...36668561.	...54578782.	1..312578962	41.1..258983	852....26899	961.....3788	83.....1467	5.........34
MAURITIUS	...47++9972.	...55578994I	2..311479974	52.1..258997	851....26899	85.....3789	72.....1477	4.........245
NAIROBI	...377708841	1..55568?962	31.612269996	64.4....58998	9831....26899	984.....3788	872.....1476	54........43
HARARE	...267789962	2..455579985	53.521249998	6614....28999	9942....6099	984.....3789	762.....1477	44........45
CAPETOWN	1...77789984	41.165569997	75.332237999	97151...16999	9953....3799	9851.....589	763.....278	44........45
LAGOS	21..++++++03	42..86568997	76.272127999	98255...5999	99772...2799	8885.....589	6772.....277	344.......45
ASCENSION Is	21..0+767755	42..97556677	761.83113899	98317I...799	99855....489	88872.....179	7775.....48	4442.......5
DAKAR	1...8+++++04	31..98657997	651.95224899	874.83...2899	99836....589	88973.....279	76751.....48	4332.......5
LAS PALMAS	....7++++95.	89999972	11..98888995	441.98768998	8863864458?9	9998531I3689	87863....378	+4+4.....4+
++ S. AMERICA								
Sth SHETLAND	1...26888874	32..47877786	651.77654578	773.86432357	6773631...25	45653.....2	13331.....	.....
FALKLAND Is	....378+++74	21..68866786	541.87632368	774.8641.147	898363I...16	68874.....3	36651.....	.332.....
R DE JANEIRO	18766773	11..28655686	441.57311388	764.761..179	998363....48	98974.....16	87751.....3	5452.....
BUENOS AIRES	....46877+73	1...68865675	431.87622257	764.863...38	9982631....6	88974.....3	67751.....1	3452.....
LIMA	.....++++61	....1.875563	111.32631136	333.535I...6	7871632....4	68864.....1	47751.....	.442.....
BOGOTA	.....++++61	875563	11...1631136	333..241..17	7771231....5	78864.....2	57651.....	2432.....
++ N. AMERICA								
BARBADOS	.....5++++72	7865684	111..7621277	433..65...58	8871232...27	988641.....5	87651.....2	5432.....
JAMAICA	.....9++++61	875563	1....1752245	322.1353..27	7771432....5	788541.....3	57651.....	2432.....
BERMUDA	.....2++++61	4876783	1....6753476	322..652.268	7771342...38	888541.....5	77651.....3	4432.....
NEW YORK	.....8++85.	887772	1....2775575	322..4552367	77612422..37	888541....15	67751.....2	3442.....
MEXICO	.....++74.	87541	1....274123	222.1.352...3	57615222....1	488541.....	16751.....	.342.....
MONTREAL	.....7++85.	1888871	1....3775684	321..4553477	77612422.157	888541....25	67751.....2	3442.....
DENVER	.....3873.	58741	67553	221.1...65234	57514..32...3	478541.....	15751.....	.242.....
LOS ANGELES	.....872.	.....873.	20331	221.1...37312	465131.24...	268541....1...	.3751.....	...42.....
VANCOUVER	.....161.	.....372.	6741	22.....17653	464131.26322	367541...31..	.3651.....	...32.....
FAIRBANKS	.....	.....1...	.....1242.	11...1124641	452153226764	243541...3432	.1351....121.	....3.....

The provisional mean sunspot number for December 1989, issued by the Sunspot Index Data Centre, Brussels, was 165.1. The maximum daily sunspot number was 264 on 30 December, and the minimum was 77 on 15 December. The predicted smoothed sunspot numbers for February, March, April and May are respectively: (classical method) 155, 152, 148 and 145; (SIDC adjusted vaues) 163, 158, 153 and 149.

1500 *K6DC*(L,P)*K7RO, XW8CW.*
1600 *KI3V/7*(Nev),*RV0YF, VE7ZG, VS6VT, XX9AF, ZK1TB.*
2000 YC0DB.
2100 *4U1ITU.*
2200 *J6DX, JW8XM.*
2300 *VU2TEC*,YC6KOS.

14MHz
0800 *UW1ZC/UA1O*(N.Zemlya).
0900 *A35ML, KH8/SM5PKK, KH0AM, T32BO.*
1100 *JP1DMX/HI8, PJ4/K3IPK.*
1200 XW8KPL.
1300 *BV2DA, BY1SK, NL7G, VP2MT, VY9CC.*
1400 *AL7HC, AP2HA, HL5FKN.*
1500 *XW8CW.*
1600 XW8KPV, *ZL1BRS, 9M6NA.*
1700 FR5AI/G, FT4ZE, *VO9DM,* YI0BIF.
1800 *SU1RR.*
1900 5Z4BI, 8J1RL.
2000 HS1BV, KD7P/NH4.
2200 A61AC, D2/LU6ELF, JA, TT8GA, *ZD8VJ.*
2300 *HC8U.*

21MHz
0800 BY5SY, HL, KL7XD, VK, ZL.
0900 BY4RSA, S0tA, XW8DX.
1000 BV2FA.
1100 *BY4AA, RV0YF.*
1300 XW8KPL.
1400 G4NXG/CT3/M, YK1AA, ZS9A, 9V1WW.
1500 AP2JZB, *XW8CW.*
1600 *VP5P*,ZD9BV.
1700 FR4FD, XF4T, XT2KG, ZS8Mt.
1800 CE0OGZ(Juan Fernandez), S79D.
1900 KL7/N8IV, VP8AOR.
2000 PJ5EUX.

24MHz
1000 9Q5MP.
1200 OA4AW.
1300 *VS6VT.*
1400 *TL8CM*,VK6RO, ZS6GG.
1700 W6, W7.

28MHz
0400 BY4WNG.
0900 BY1PK, BY5RT, JT1KAA.
1000 *BY5RT*,KH0AC, 3C1EA.
1100 *AT0X*,XW8DX.
1200 A61AD, *JY9MO*,P29KGW, XW8KPL, YI0BIF, ZD9BV, 3XtSG.
1300 *FY5YE.*
1400 P43TH, XT2KG, XT2PS.
1500 A45YT/ND, *FH5EJ*, FR5EL, TG0FRACAP, TZ6PS, V31BB, *XF1C*, ZF2OA.
1600 ZF2AG/ZF8.
1700 HT3A, WE7B(Utah), 4U1UN.
1800 FS5R,*KH6IJ, 4U1WB.*
1900 K7SFN(Nev), WZ7J(Idaho).

Thanks go once more to the *DX Bulletin* (VP2ML), *DXNL* (DL3RK), the *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), the *Ex-G Radio Club Magazine* (WA8TGA), *DX Report* (VK9NS), the *Lynx DX Group Bulletin* (EA2JGO), and *DX'press* (PA3CXC).

Closing date for March is **24 January** and for April **1 March.**

VHF/UHF

NORMAN FITCH G3FPK

This month's report is being compiled in the last week of the 1980s. Many journalists will be reviewing the year and the decade, but I see little point in devoting very much precious space for this purpose. Suffice it to say that 50MHz has probably been the star turn in 1989, as a glance at the tables will confirm. Looking forward, in a few weeks time we have the important IARU Region 1 Conference in Torremolinos. Over fifty papers on VHF/UHF topics have been submitted, including some by the RSGB. They range from the very sensible to the 'you cannot be serious!' variety, so there could be some lively discussions before a general consensus on band planning is reached.

All the delegates in Torremolinos will be radio amateurs, but in Seville in 1992 there will be a World Administrative Radio Conference – at which we will have no individual voice. This is where many nations will be staking their claims for more spectrum space, and many are not at all sympathetic to amateur radio.

RESOLUTIONS

A New Year is a traditional time for making resolutions. Following on from the previous paragraph, one resolution we must make is to use our bands to the full, since there are many other services casting their greedy eyes on them. Instead of complaining about the overcrowding on 145MHz FM, why not use 430MHz or 1.3GHz for local nets?

Another resolution we should make is that we will do our very best to radiate decent signals. In the 144MHz Fixed Contest on 3 December last year, there were far too many sub-standard signals emanating from operators who should know better.

TABLES AND AWARDS

The Society's VHF/UHF Awards Manager, Ian Cornes, G4OUT, is a member of both the VHF Committee and the VHF Contests Committee. He has confirmed that the counties list for Society awards and contests purposes has been rationalized at last. This means that the Isles of Scilly will now count as Cornwall, using the CNL code, and that Humberside will no longer be split into north and south; the code will be HBS. There are now 77 counties/regions; they were listed on page 67 of the January issue, but IOS was still included in error.

The countries list has been under review and is being corrected for the 1990 *Call Book*. Ian has reminded me that Sicily, IT9, is accepted as a country for RSGB VHF awards, so you can add it to your 1989 total if you worked it on 144MHz Es.

NOISY EXCHANGES

No, this isn't about repeater abuse. Wally Blanchard, G3JKV (SRY), has been suffering from severe QRM for six years, the culprit being British Telecom. The offending apparatus is a switched mode power supply for a 'small business' telephone exchange located in a building about 100 yards from his QTH. This thing operates at 50kHz and harmonics are detectable to beyond 250MHz, those on 144MHz being S9.

Wally wrote, "I notified BT as soon as the interference appeared, but after investigation (by a junior engineer who didn't seem to know what RF was) they told me it was 'within specification' and they didn't propose to take any further action – and they haven't." He found the radiation from the PSU "...could be cured by putting a tin box around it." However, when the company owner approached BT, they told him he could be liable for substantial damages if he allowed anyone to modify it.

Wally continued, "By chance, I met the BT engineer who designed the unit. He told me he was well aware it radiated RF but had been told not to waste time and money fixing it because nobody would notice. He also confirmed that, at that time, BT had NO specifications covering radiated RF interference!"

So this is another item to add to the list of QRM machines. In many areas of the UK nowadays, the sum total of QRM from computers, TV receivers which use SMPSUs, telephone equipment, etc makes pursuit of our hobby impossible. This is the case at G3JKV, who has virtually been driven off the amateur bands altogether. He concluded, "I've kept the callsign in case one day I move to a quieter location." Is anyone planning to *do* anything about this disgraceful state of affairs?

SOFTWARE

Last month I mentioned contest scoring programs for the Amstrad PCW computers. David Wittiams, GM1SSA (SCD), inquired about duplicate checking routines to search through 1,000 or more callsigns. This would have to be a machine code exercise, so has anyone anything to offer? David is QTHR and can also be reached via packet radio @GB7MAC.

Several readers have asked about RTTY programs for the PCWs but I still don't know of any. Maybe BARTG members know of a source for Z80A microprocessor machines? Wyn Hughes, GW4ZXL (DFD), uses a Commodore 64 for RTTY but would like to get something running on his PCW8256.

I have been sent two programs which predict the actual peak of meteor showers. They originated in the USA and are in Microsoft Basic, which can be converted to Mallard Basic with a bit of fiddling. They were written and/or modified by several amateurs including Chip Brown, KA1P, Joe Reisert, W1JR, and Jim Reisert, AD1C. Unfortunately the predicted peaks did not agree; while some were within a few minutes, the Arietids differed by 38 hours! Predictions are derived from the solar longitude and a difference of one degree is near enough one day. It is a chicken and egg situation really, since you need to use the solar longitude at maximum – and the maximum is what you want to predict.

I hope to acquire the 1990 Radiant Catalogue from the British Meteor Society and will then amend these programs using the latest data. Until I have done that, I don't propose to quote any predicted peak times and dates.

There were a couple of dozen MBasic programs in this collection covering sun and moon location, EME link budgets, HF and tropo propagation, and so on. I haven't had time to examine them all, but those I have looked at are pretty rudimentary with little in the way of on-screen documentation. One called GREYLINE gives negative azimuths for the greyline in the summer months, so I'm not very impressed.

RARE SQUARES

Colin Morris, G0CUZ (WMD), passed on some news about the next GW0KZG/MM operation. Andy now has a 100W PA on the *Challenger* and the next operation is planned to start on 5 April. It is a 32-day trip around the north of Scotland, Shetland and the North Sea; a detailed itinerary is awaited. Andy gave many operators some rare, wet squares last year.

Damian Wood, LA0DT/MM, is another well known dispenser of wet squares from the *MV Seis Venturer*, aboard which he ran 150W to a small Yagi. Colin wrote that Damian was due to be operating till 5 January, but if he did he must have encountered some really rough weather. His home QTH is now Sanday (OKE) in IO89 square.

POSTAL MATTERS

Nick Perrott, GJ4TAW, asks me to remind those wanting a direct QSL from Channel Islands stations that UK postage stamps are not valid in GJ and GU. Please send an IRC, dollar bill or even a 20p coin if you need a direct QSL from him. The same remarks apply to the Isle of Man, which is not part of the UK, either. UK stamps are only valid in G, GI, GM and GW.

SPORADIC E

Paul Turner, G4IJE (ESX), mentioned the very short-distance E-layer QSOs made to Holland on 50MHz on 27 November. From data

in a CCIR document number 6/147-E, one can calculate the maximum frequencies at which Es propagation might be possible. Three parameters are required; the frequency at which Es reception is occurring, the distance to the the transmitter and an idea of the ionospheric attenuation.

In this case, the first two are 50MHz and about 400km. The last is the difference between the free space signal level, which is easy to calculate, and the observed signal level. Let's be pessimistic and assume 30dB which gives a critical frequency of 24MHz.

For an 'average' station running 30W with a 10dB gain antenna and 3kHz bandwidth, the graphs indicate an MUF around 180MHz, an optimum ORB of 1800-1900km at 144MHz, and a received signal strength better than 25dB over noise, or about S6. Assuming a reflecting region over JO11 square, this suggests Es propagation could have been possible between northern Scotland and the Nice area in southern France, northwest Ireland and Austria, and southern Norway and southwest France.

Some years ago, *DUBUS* magazine carried a report of 144MHz Es contacts in late October, but I cannot recall any being recorded later than that. Did anyone hear anything unusual that day? Don't ask me - I was writing the January VHF/UHF!

POOR SIGNALS

Conditions in the 144MHz Fixed Contest on 3 December were quite good for inter-G working and many stations in a 200-500km radius from G3FPK were 10-20dB above average. However, the quality of many of them was pretty poor - so I make no apologies for raising the topic yet again.

From numerous tests conducted over many years with operators who really understand what 'linear amplification' means, I know what *can* be achieved. The essential requirements are a stable amplifier which is not overdriven, an adequate power supply and correct loading into the antenna system. At G3FPK, a good-quality transmission which is 70dB over noise is not detectable more than 3-4kHz away from its centre frequency.

During the December contest I noted several signals from distant parts that were around 60dBn - about S9 plus 30dB - but whose distortion products were delectable 25-30kHz either side. That must have meant that their locals would not have been able to work the weaker stations in a considerable part of the band; some may have given up in sheer frustration. Quite a few were from well-known stations who you might think had been around long enough to know better.

LOCATOR SQUARES TABLE
Starting date: 1-1-1979

Callsign	50Mhz	144Mhz	430Mhz	1.3GHz	Total
G4RGK	50	299	133	51	533
G3IMV	206	427	125	51	809
G0DAZ	137	316	122	39	614
G4KUX	-	384	120	-	504
GJ4ICD	328	263	119	59	769
G4XEN	66	292	114	-	472
G6DER	43	183	114	82	422
G6HKM	187	217	109	46	559
G1KDF	139	180	102	37	458
G0GMB	-	187	99	-	286
G4SSD	-	256	98	-	354
G8ATK	-	143	94	52	289
G4MUT	82	153	93	31	359
G1GEY	-	170	92	22	284
G8LHT	104	182	91	11	388
G4PIO	-	261	87	-	348
G4RRA	-	280	80	-	360
G0CUZ	-	329	73	-	402
G6STI	-	152	69	24	245
G0EVT	66	206	57	-	329
G1SWH	97	141	57	-	295
GJ6TMM	62	151	47	-	260
G6ODT	-	21	47	-	68
G6UWO	-	41	44	18	103
G4VXE	147	162	42	4	355
G8PYP	95	105	31	-	231
GM4CXP	-	198	31	-	229
GM0GDL	-	83	22	-	105
G1DOX	54	73	16	8	151
G1CEI	8	74	15	-	97
G4IJE	307	338	5	2	642
G7CLY	-	41	1	-	42
G6HCV	219	231	-	-	450
GM4YXI	-	340	-	-	340
G4SWX	-	333	-	-	333
G4DHF	-	325	-	-	325
G0JHC	212	48	-	-	260
G3FPK	-	241	-	-	241
G0LFF	83	153	-	-	236
GW4FRX	-	228	-	-	228
G4DOL	-	216	-	-	216
G8XTJ	44	120	-	-	164
G4XBF	-	150	-	-	150
G0HVQ	69	71	-	-	140
G4TGK	-	137	-	-	137
GW4VVX	-	115	-	-	115
GM0GEI	101	-	-	-	101
G1WPF	-	101	-	-	101
G0HDZ	-	64	-	-	64
GM1BVT	41	21	-	-	62
GM1ZVJ	6	48	-	-	54
G6MEN	48	-	-	-	48

No satellite, repeater or packet radio QSOs. 'Band of the month' 430MHz.

The more responsible operators spend some time before a contest carrying out checks with other stations to ascertain if there are any problems. After all, a good pair of ears is far better than any meters or flashing LEDs - and since when did someone invent a meter which shows how linear the amplifier is? Sometimes all that is needed is a small adjustment of the PA loading control to get rid of some high order intermod. products, or a touch less drive.

The less responsible operators will not accept there is ever anything wrong with their equipment. They trot out the usual phrases such as, "Nobody else has complained..." or "It must be your poor receiver." Some may grudgingly agree to turn their awful speech processor, or the drive level, down a notch, but soon turn everything up again.

The *only* way to deal with these operators is for the organizers to *disqualify them from the contest they have ruined for others.* If the adjudicators receive a significant number of genuine complaints about a particular entrant, that should be no problem. But they must be sure that the complainant's receiving system is not part of the problem and that the complaint is not a case of 'sour grapes.'

To summarize, if you are quite sure that a particular station is causing unnecessary and avoidable interference, say so when you work it. If the operator seems uncooperative, politely tell him or her that you are making an appropriate note in your log and ask them to do the same in theirs. When submitting your entry or check log, you should compare the offending station's performance with that of a decent station. For example, "G4.../P was 65dBn and I was getting nasty distortion products 25-30dBn out to 25kHz. G6.../P was consistently 70dBn but I could not detect his signal more than 4kHz out."

There is *no excuse* for radiating bad signals, nor any reason why we should put up with them whether in contests or major openings. Enough has been published in *RadCom* and elsewhere to explain how to transmit a signal to be proud of.

50MHz

The November report from Ray Cracknell, G2AHU (HWR) refers to "...another month of outstanding results... with propagation to the east (VK, JA and the Pacific) gradually being supplanted by an almost daily feast of DX from South America, Central America, the West Indies, Canada, Newfoundland and the USA, across to the Galapagos Islands."

Most of the DX achieved was covered in the January VHF/UHF but one event on the 27th is worth mentioning - the strong winter Es opening to ZB2 and CT. From further afield, equally spectacular results were reported by SV1DH, Z23JO, 5B4AZ, ZD8MB and JA1VOK.

Last month I quoted from a letter from Andres, EA7AG, in which he stated there was *no* legal 50MHz operation from Spain, EA6, EA8 and EA9 by Spanish nationals, let alone foreigners. Nevertheless, QSOs with EA8/G3JVL and EA8/G0KPW have been reported. To clear up the matter once and for all, may I ask those operators to send photocopies of their Spanish 50MHz permits? My understanding is that amateur radio licences for all EA prefixes are issued from Madrid.

As always, Ted Collins, G4UPS (DVN) produces '6m Information' sheets which are full of interesting news. An FT-620B is being sent to OX3LT, who expects to be quite active from Greenland. On 3 December the Danish Radio Amateur Society broadcast the news that OY and OZ Class A and B licensees would have access to the band from 1 January; further details are awaited.

Jim Langdon, J37AE, is QRV from Grenada. His QSL address is: Philatelic Dept., Post Office, Sauteurs, Grenada, Windward Islands. Julio Vera-Cruz, D44BC (HK66), has been on from 10 November; his QTH is PO Box 36, Mindelo, Republic of Cape Verde. CU2BO has ordered an Icom 50MHz rig and may be on from Sao Miguel (HM77) by the time you read this.

CO2CB (EL83) is a new Cuban station whose particulars are: Carlos Campos, Box 4004, Havana 4, Cuba. Pierre Pasteur, HB9OO, has advised that the Swiss PTT will be issuing 50MHz permits for 50-52MHz, 100W ERP, probably outside TV hours. The starting date was not known at press time.

Darrell Moody, G0HVQ (GLR), sent in a report covering the period from mid-November to mid-December. He was on for the major aurora on 17 November and worked GI and GM. Best DX worked via F-layer on the 19th was PZ1AP (GJ25) at 1232, then on the 20th HC5K and HC2FG (FI07). Darrell caught the end of a USA opening on the 24th, best DX being K3MLD (FN10). The 26th brought another transatlantic opening, 1330-1500, and QSOs with VY2ZZ(FN86) on Prince Edward Is. and VE2YU (FN35).

Darrell mentioned openings to the USA back in December on the 4th and 6th. He took the afternoon

of the 11th off work and between 1345 and 1600 worked W1AJR (EN91), WB8VYF (EM79), VE1HD (FN96) and VE3FAS (EN94). He suggests an activity evening since the band usually closes for DX after about 1700 in the winter; any takers and if so, what would be a preferred day and time?

On 23 November Neil Carr, G0JHC (LNH), worked VO2AG (FO62), the only active station in Labrador; on the 26th VO1OF and VO1JN; on the 30th, three new countries, ZF8AA, HH7PV and three KP4s. On 3 December he finally contacted TR8CA. D44BC was a new country worked in a 30-minute opening on the 10th, and Neil wishes such DX would work split-frequency.

There was a good opening to W8, 9 and 0 on the 12th, when signals were still S9 three hours after UK sunset. As there was some Es propagation, Neil wonders "...could this mode have been linking up with the greyline which, at that time, was in mid-Atlantic?" The 13th brought OSOs with EA8/G0KPW and FY5AU, and 9Y4VU on CW on the 15th was a new country. 50 USA stations were worked in just over an hour on the 17th, plus VE2KV (FO60).

John Heys, G3BDO (SXE), made 182 North American OSOs between 1 November and 18 December, covering all USA call areas except 6 and 7, plus VE1-3 and VO. Other 'nice bits' included HC2FG on 20 November, KP2A on the 21st and VO1R (GN26) on the 26th. December DX were FY5AU (GJ34) and HC5K on the 4th, PZ1AP on the 9th and KP2A again on the 15th.

Brian Booth, G3SYC (YSW), worked Mike Payton, K0SFH (EM29), in Kansas on 11 November; that QSO completed Mike's WAC on CW using only 3W. In 1981 he made WAC and WAS with 3W of SSB. On the 16th, Brian worked VK8GF (PG66) at 1025 and this little opening seems to have gone largely unnoticed. He contacted OA8ABT (FI21) on the 24th.

Chris Gare, G3WOS (HPH), wonders if he can claim two 'G firsts' in November with OA8ABT at 1305 on the 14th and V9IB at 1436 on the 18th? VK3OT (OF12) at 0858 on the 23rd was a definite first, he says. New for G4IJE on 30 November was C56/OH2FQ as was OA8ABT on 3 December. Between 1807 and 1912 on the 12th, Paul worked 33 Ws, best DX being N0LL (EM09) in Kansas, one of six W0s, the rest being W8s and W9s. On the 19th he found K5ZXE (EM14) in Oklahoma.

G4UPS's December log looks very rewarding. On the 1st, Ted contacted W1-3, VE1 and VE2 stations between 1212 and 1545, then G, GI and GM stations in an aurora between 1843 and 1954. The 2nd brought QSOs with HC5K, KP2A, V29OA (FK97) and WB4OSN and K4KUZ (EL96). On the 3rd he worked EL2B (IJ46) at 1050. HI8PM was heard at 1225 but was swamped by Gs working PAs. Later OA8ABT, VE1s and HC5/N6DLU (FI07) were worked.

ANNUAL VHF/UHF TABLE
January to December 1989

Callsign	50MHz Cty	50MHz Ctr	70MHz Cty	70MHz Ctr	144MHz Cty	144MHz Ctr	430MHz Cty	430MHz Ctr	1.3GHz Cty	1.3GHz Ctr	Total Points
G1SWH	77	33	74	7	97	22	55	9	-	-	374
G8LHT	69	18	35	5	95	30	54	15	13	5	339
G6HKM	61	45	-	-	81	28	51	17	37	10	330
G0IMG	69	29	41	5	56	12	27	5	-	-	244
G1DOX	36	8	49	6	66	18	29	6	16	7	241
G4XEN	24	9	23	4	80	31	44	13	-	-	228
GW6VZW	78	33	-	-	71	21	-	-	-	-	203
G4PIQ	-	-	-	-	88	34	53	20	-	-	195
G8PYP	35	26	1	1	55	25	28	11	-	-	182
GD6ICR	8	4	34	5	54	12	40	7	8	4	176
GM1SZF	41	11	-	-	71	16	7	6	-	-	152
G8XTJ	43	19	-	-	56	15	-	-	-	-	133
G0EVT	24	24	-	-	40	29	6	7	-	-	130
GM4CXP	26	11	4	1	60	19	4	3	-	-	129
G4OUT	-	-	28	5	54	20	-	-	-	-	107
G3FPK	-	-	-	-	78	26	-	-	-	-	104
G1GEY	-	-	-	-	-	-	58	16	21	7	102
GW4FRX	-	-	-	-	70	32	-	-	-	-	102
GM0GEI	61	29	-	-	-	-	-	-	-	-	90
G1CEI	5	5	-	-	51	14	8	4	-	-	87
G6ODT	-	-	-	-	23	9	41	12	-	-	85
GJ6TMM	28	12	-	-	23	9	1	4	-	-	77
G7CLY	-	-	-	-	58	14	4	1	-	-	77
G4TGK	-	-	-	-	55	18	-	-	-	-	73
GM0JOL	-	-	-	-	52	12	-	-	-	-	64
GM1ZVJ	4	3	-	-	26	16	-	-	-	-	49
G0HDZ	-	-	-	-	38	7	-	-	-	-	45

Do not include EI counties, British counties are the 79 listed in the January 1989 *RadCom*. Up to three different stations allowed in all 12 GM regions. Countries are the usual DXCC ones.

The 4th saw OSOs with HC5K, HC2FG, HC2FE, W1, 2, 3 and 8 stations in EN72, EN92, FN13 and EN80, the best DX being K5JL (EM15) in Oklahoma at 1647. At 1103 on the 6th Ted worked TU2OJ (IJ76AM) and from 1350 had contacts with the W1, 3, 4, 5, 9 and 0 call areas up to 1651. The next good day was the 9th starting with PZ1AP at 1146. At 1243 Ted had a CW OSO with CT1DTO, their respective OTEs being 270 and 300 degrees. Between 1225 and 1509 he had more OSOs with W1-4, 8, 9 and VE1 stations.

On the 10th, D44BC was working G, GM and PA stations from 1120 but Ted heard nothing in Hemyock. Otherwise, the 10th and 11th followed the same pattern of North American OSOs as the 9th. The star OSO on the 12th was with VE4ABE (EN19) at 1750, followed by contacts with W9s and W0 who were audible up to 1940. The 13th began with an MS OSO with SM7FJE at 0833, then 8P6JW and 8P6LL at 1225. W1-4s were available from 1350-1620 and he had two SM6 OSOs later. The CT0WW beacon was audible till 2150.

At 0812 on the 14th Ted had a OSO with SM7AED via E-layer. VK3AMZ was heard at 0912 but was swamped by Gs calling CQ. Best DX later was HH7PV at 1400, along with east coast Ws and VEs. The band was open to W1-4 and VE from 1450-1625 on the 16th resulting in several OSOs. The next day it opened at 1330 with similar results. Russian TV and military FM traffic was heard from 0830 on the 18th, and east coast Ws were in between 1335 and 1445 when it all faded out.

Byron Fletcher, G6HCV (SFD), missed last month's deadline. New countries in November were HH7PV, HI8W, HK3AVR, KP2A, KP4BZ, OA8ABT, P43AS, PJ9EE, PZ1AP, TI2KD, V47SIX, VP5D, DL3ZM/YV5, ZD8MB, ZF1RC, F6CBC/6W1 and 8P6JM. Some choice stuff there OM.

Ela Martyr, G6HKM (ESX), worked many W and VE stations in the good openings on 24 and 26 November. On 13 December, the only stations heard/worked were PZ1AP, and two 8P6s. She heard HH7PV calling CQ and had a OSO, exchanging RS41 reports, but nobody else seemed to work him.

Geoff Brown, GJ4ICD, sent a letter which arrived on 9 December and covered Jersey happenings in November, during which he added another 75 squares. This is not surprising since, when there is an opening, he is in great demand as most are looking for their first GJ. The 10th was a superb day with a four-hour opening to the USA during which he had contacts with all call areas except W6 - California. 62 squares were worked, 29 of them new, and best DX was K7KV (CN87).

Now for claimed 'firsts' from Jersey. On the 8th, EL2FO at 1517; on the 9th, JA6WFM/HR2 at 1336; on the 12th, F6CBC/6W1 at 1019, KG4SM (FK29) at 1253 and ZF1RC at 1315; on the 15th, HK3AVR at 1225; on the 18th, PZ1AP at 1340; on the 19th, V47SIX at 1127, DL3ZM/YV5 at 1154 and PJ9EE at 1159; on the 21st, PY0FF at 1102 and on the 26th, C56/OH2FO at 0944.

As I have remarked previously, it is quite astonishing how propagation from Jersey Island at latitude 49.2 degrees is consistently far superior to that from the south coast of England. The received signals are usually far greater. True, it is a small island - but why don't those situated on the south coast, and looking over the sea, get comparable results?

Still on the 'firsts' theme, I omitted to record a claimed one from England by Dave Gregory, G8JDX (DVN), with the Galapagos Islands -HC8K (EI59) at 1404 on 27 October.

William Pellett, GM1BVT (CTR), now has an FT-690 Mk 2 transceiver. His November DX included OA8ABT on the 9th; HC5K on the 10th; PZ1AP, VE1YX, HH7PU and VO1OF on the 11th; FY5DG on the 15th; WY2ZZ, VE1ME, WC2K and K1DPP on the 25th and VE1YX, VO1OF, VE1MR and HC5K on the 26th. Nice to read that the GMs are getting some of the good DX.

Ian Wilson, GM1XOG (SCD), hasn't missed out, either. In the big aurora on 17 November he worked over 30 stations in G, GI, GW, PA and OH. The next day he contacted HC1BI, then on the 19th, FY, 8P6, PJ9, HI8, KP4, HH and some east coast Ws, HC, V47, VO2, VE3 and W1-3 stations were worked on the 20th and more VEs and Ws on the 23rd to 26th. In December, Ian listed similar conditions and contacts on the 4th, 7-12th, 15th and 17th, but is still looking for Africa and Oceania to complete his WAC.

John Fairgrieves, GM1YZW (WIL), worked 40 Ws and 11 VEs in November from Lewis, all signals being 'exceptionally strong.' He had OSOs with G, GI, GM and GW in the aurora on the 13th and with OH3MF (KP30) in the one on the 17th. On 2 December at 0 t09 John Hillon, GM1ZVJ (LTH), worked OH1ZAA (KP01) - with 2.5W and the quarter-wave whip on his FT-690 Mk 2.

Finally to Wales and Paul Baker, GW6VZW (GWT), a regular contributor to my VHF columns in other magazines from way back. His main activity is now on 50MHz despite TVI problems, his station comprising an FT-690 Mk 2, 25W to a 3-element Yagi at 30ft. His report covered operations from mid-October to the end of November. He worked his first W on 16 November, W3HQT (FN54), and the following day saw a big aurora resulting in 66 contacts, 28 squares, 35 counties and 10 countries; the OTE was 40 degrees. At 2158 he contacted TF6MM (IP24) via auroral Es. From the 19th he worked assorted east coast Ws, VE3, VO1 and HC5K on the 21st.

70MHz

The sole piece of news this month is from GM1XOG who has an old Pye Cambridge transceiver which he hopes to tune up on 70.26MHz in the near future. Not a single report has been received about the CW contest on 10 December.

144MHz

Andrzej Kaleta, SP6GVU, who runs an IC202S, 30W PA and 17-element Yagi, sent a report covering the aurora on 17 November. He listed 24 OSOs between 1532 and 2157 with D, G, GM, GW, OE, OZ, PA, SM and UR stations. He heard EI4CL, F6DWG, GW4VEO and at 2115 I2FAK who was only working D, G and PA. Between 0948 and 2335 on the 18th Andrzej enjoyed some excellent tropo propagation to Scandinavia. Contacts were made with 16 SMs in the 0, 1, 5 and 7 call areas, plus OH6OR (KP22), OH1CF (KP00) and OH1ZAA.

Jim Bacon, G3YLA (NOR), told me of an interesting contact made in the 17 November aurora by his twin brother G3WRJ (HFD). He was using a little 2W home built transceiver, a club construction project sponsored by the Shefford Radio Club. He heard OH7KB (KP33) at good strength calling CO with no response, so answered and made a OSO using a 9-element Yagi. Most everyone else was beaming east to work the SPs, etc. A touch of auroral Es?

G6HKM reckoned the skip was all wrong for Essex stations on 2 December as the best DX was going over their heads. Ela worked SM6NET (JO68), SM6RTN (JO78) and LA9DI (JO59) but heard nothing of the Stockholm stations. GJ4TAW only uses the band for local and packet work but Nick has 100W available to a fixed 4-element Yagi beaming north. In the aurora on 1 December, GM1ZVJ worked G1DFN (IO94), G6IJM (IO83), EI4DW (IO64) and GW8ELR (DFD) and in a weak event on the 4th, John found GM1SZF (IO88).

John Nelson, GW4FRX (PWS), took part in the tropo lift on 2/3 December but found it very localized. One or two very strong stations would appear for a while, then disappear, to be replaced by others. This pattern was evident from 1520 to closedown at 0122. Best DX was UR2RO (KO28GI) at 1824km, using CW. John worked three SMts (JO97), and most of the other contacts were mainland SMs plus a few OZs and Ds. John also mentioned an aurora on 29 December in which he heard SK3LH (JP93) at 55A but was unable to raise him despite calling for a good 15 min. Pity - that would have been a very fine contact from IO82.

Brian Clowes, GW4HBZ (CWD), runs 300W and a 9-element Yagi from the BBC transmitting site at Moel-y-Parc, 1150ft ASL. He worked 36 SMs on 2 December in JO78, 79, 86, 88, 89, 97 and 99, including the three SM1s, and SM5AOJ and SK0UN near Stockholm. The 3rd was very frustrating as he could hear a PE1 off the back of his beam working many SPs, none of whom were audible in Clwyd.

430MHz

A familiar comment from Don Stoker, G1GEY (TWR), who asks "Where is everybody?" Up to 6 December Don had only made 700 QSOs in the year, so he reckons activity must have been poor. G6HKM took part in the fast leg of the Cumulatives on 30 November and made 60 OSOs. Conditions had improved by 3 December, enabling Ela to work GI0GDP (IO74).

Karl Lamford, G6ODT (NHM), found the contest hard going with not many stations heard. His best contact was G4ERG (IO93). On 2 December he worked GW8ELR, ON1ABO (JO11), F6FLE (JO00), G6IPH (SXE) and SM6ESG (JO67); on the 3rd GD4XTT (IO74) and the next day G8PON (NOR). On the 5th, beacon DB0VJ (JN67) was audible from 1628 for four hours but activity was very low. HB9AMH/P (JN37) was copied from 1800 and by 2045 he was S9 plus 40dB.

In the 30 November contest, GJ4TAW only made three contacts and all were S9 once they pointed their antennas to Jersey. Nick wishes more people would listen and call in his direction as he has t00W, a 21-element Yagi and masthead preamp available.

THE MICROWAVES

G1GEY is ORV on 1.3GHz and entered a score for the table but didn't give any details of any recent activity. G6HKM finally worked ON1CDO and ON1CAK on 2 December; next day Ela contacted GI0GDP, GI4OPH, G6LZO, G3UVR, G1SLE, G4XEN, G4OIG, G8UYR and DL2KBB (JO30) on 1.3GHz. The final session of the Cumulatives on the 8th "...was a disaster with t1 QSOs in the first half hour and only one more in the last hour and a half."

On 1.3GHz, GJ4TAW is putting 12W to his feeder with a 55-element Yagi at the business end. However, the cable loss is 3dB so Nick plans to increase the power "substantially" and install a masthead preamp. On 2.3GHz he is assembling a station but in May 1989, operating portable from the north coast of the island, he made what may be the first OSOs from GJ on this band.

G8GGK

It is my sad duty to report the death of personal friend Ken Miles, G8GGK, from Selsdon in Surrey, on 28 November; he had been in poor health for some years. Ken was a true radio amateur with a sound technical knowledge and years of practical experience and home construction to his credit. He was an outstanding signal on 144 and 430MHz and did a stint as a GB2RS news reader in the days of AM. Our sympathies go to his widow, Ethel, and to his sons and families.

DEADLINES

Please send your news for the April issue by 24 February and for the May edition by 24 March. The 1990 Annual Table will appear in the April issue so send in your scores, however modest.

Don't forget that I have a Telecom Gold mailbox, 76:MSX022 and also a telex number 93121 32268(SAG).

SWL

BOB TREACHER BRS32525

50MHz

Although it was not quite as spectacular as it has been, the 50MHz band provided some quite good DX. The fine Caribbean openings of late November appear to have been replaced with rather later openings to North America, with the occasional African station thrown in.

David Whitaker, BRS25429, missed out on much of the Caribbean DX as a result of enjoying himself in W6. Since returning, David logged a total of 115 different USA and Canadian stations; most were in the FN grid square, which is beginning to have something of the flavour of our own fO91! David specifically mentioned HC5K and V29OA on 2 December and TR8CA, OA8ABT, HC2FG and HC5/N6DLU on the 3rd. There were Stateside openings on 9, 16 and 17 December, and the highlights of these were K9RS (EM79) on the 9th and VE2KV (FO60) on the 17th.

Martin Parry, BRS52543, also fared quite well on 50MHz. His report mentioned PJ9EE (FK52), HI8WGT (FK58), KG4SM (FK29) and Ws and VEs in EN81, FM09 and FN03, 10, 21, 23, 24 and 34.

On 2 December V29OA was 5 and 9 at this QTH, together with four HK stations. The 3rd also netted OA8ABT (FI21), three more HKs and several Canadians. The last session on the band before Christmas produced D44BC at 1147 for country number 49. There were openings to the USA on 26, 27 and 28 December - more on these next month.

144MHz

Nothing to report this month except that G6MWY wrote describing a strange occurrence whilst operating a JOTA station on 21 October. He heard a station signing 'C9CT' on 144.3MHz at 1600. A Mozambiquean station appearing on 144MHz doesn't sound very likely for a variety of reasons, but it seems that a number of stations on the south coast between Plymouth and Portsmouth also heard him. A few called him but they suffered QRM from F6CTT, who was calling 'CO Aurora' at the time. Can anyone shed any light on this - or was it someone playing a JOTA joke?

Mick Toms, BRS31976, reported that the December 1989 AFS Contest produced GI8AYZ (IO64) for an all-time new square. He now needs just IO41, 43, 44, 55 and 89 to have heard all UK and Eire squares. Maybe some of the summer DXpeditions will reduce these by one or two. Mick also listened during the EME contest in November, he didn't expect to hear much with only a single 9-element Yagi and a doubtful front-end but he was wrong. Plenty of Europeans were heard off the back of the beam, and a very weak VE1 station was heard calling CO. Most pleasing of all was hearing W5UN; if a card materializes, Mick will have three continents confirmed on 144MHz.

David Whitaker also sent in a report of his 144MHz loggings. Both 2 and 3 December were good days, with Scandinavians on the 2nd and East Germans on the second; the Scandinavian opening produced OZs in JO55 and LAs in JO38, and Swedish stations in JO57, 67, 68, 78, 86, 89 and 97 were heard. This was almost the only Scandinavian opening in 1989 so there were some welcome squares to add to the yearly tally. *(Our news editor logged a good tropo opening on 24/25 January 1989, another on 25/26 May 1989 and a lot of auroral events up that way, plus at least two good Es openings to Finland -Ed.)*

CQWW SSB

Once again this contest seemed to be blessed with very good conditions, but some felt that at this stage of the sunspot cycle they could have been even better. As usual, there were many DXpeditions to the contest-winning Caribbean, which increased the number of countries available for the taking. There was hardly any propagation to the Pacific, and little from Africa south of zone 35. Even so there was plenty to hear and 28MHz was very productive, although the morning sessions were confined to hordes of

1989 UHF/VHF TABLE

Station	50	70	144	432	Total
BRS32525	152/49	11/5	96/26	14/5	358
BRS25429	127/30	-/-	94/23	16/7	297
BRS52543	121/38	22/6	41/14	18/8	268
BRS31976	-/-	5/1	97/27	41/14	185
F11ATZ	4/4	-/-	59/20	7/3	97
BRS62088	32/9	-/-	22/8	-/-	71

The format of the table is squares plus countries. Please ensure that these table figures are updated to 31 December.

European and Japanese stations. The 7MHz band was quite good on the Sunday evening, with AP, BY, ZS8, YK, VK, JT and TZ heard. Top Band, however, continued to provide very little and the only new ones for listeners were CN0A and HV3SJ.

This contest always brings out some weird and wonderful callsigns, and some may wonder which countries they emanate from. Some of the 'special' prefixes, together with their country status, were as follows; 4J5FV (UF6 - via RB5IJ), HT (YN), HU (YS), TX (F), CS (CT1), XL3 (VE3), YT and YZ (YU), YY (YV), 4M (YV), CQ8 (CT), OL (OK), CR3 (CT3), DX (DU), 5J (HK), 6D (XE), H2 (5B), ZW and ZZ (PY). Some of the more exotic DX heard during the contest was as follows; BY5RA, W6YB/C6A, FM5OL, FY0P, FS/KC1F, HC8K, HP2/KC4VPK, J37DX, NY6M/KH2, TL8WD, V31B, V47K, VP5T, 5H3TW and 9J2FR.

No doubt many SWLs will want to QSL some of the DXpeditions logged during the contest. The following list may help you to direct your card to the right manager:

AZ5D via LU8DZE
CW0L via CX4CB
DX1A via DU1AU
HT3A via SM0KCR
HU1A via YS1MAE
FS/KC1F via KC1F
FY0P via FY5AN
HC8K via KT1N
HI9UD via HI3AMF
HX1DX via F6GMB
IG8R via I0RIZ
IH9A via IV3YYK
IM8A via IK8DOI
IY2A via I2MQP
J37DX via W8KKF
L8H via LU4HH
LT5F via LU5FCI
LX7A via DF3CB
OL8A via OK3KZ
PJ1B via K2SB
PJ2U via NK4U
PJ8T via K4PI
PJ9W via OH6XY
RL1P via RL8PYL
RQ7W via UQ1GWW
TE2Y via TI2LCR
V31B via V31BB
V47K via WB2P
V47QO via W9OQ
V63DX via JA7HMZ
VP5Z via W3HNK
ZB2X via OH2KI
ZW5B via PY5EG

HF BANDS

The major news this month concerns activity from XW8 and - at the time of writing - the imminent landing on Bouvet. The HA gang had been very active from XW8; the QSL route is via F6HIZ, who has advised that cards MUST be sent to 'XW8CW/DX, PO Box 67, Vence, F-06140, France'. Apparently the exact address must be used; cards sent by any other route will be returned via the French bureau. A JA group was also active over the Christmas period, signing XW8KPV.

1989 HF TABLE

Station	DXCC	28	21	14	7	3.5	1.8	Total
BRS25429	270	215	225	241	177	128	45	1031
BRS8841	272	219	234	233	160	119	57	1022
BRS52543	240	178	191	204	153	109	42	877
BRS32525	194	161	84	129	64	45	36	519
BRS1066	166	85	107	122	90	37	38	479
BRS20249	132	56	72	87	32	24	7	278
BRS91244	59	24	17	35	12	9	0	156

I am now resigned to a poor turn-out to this year's table, which is very disappointing. Will everyone with an entry now please update to 31 December.

At the time of writing the LA expedition had landed on Bouvet and should have been active as of 1200 on 28 December. I hope everyone manages to log the trip, and we should have some reports of their activities next month.

Other interesting activities around Christmas were the appearance of SM7PKK as 3D2XR from Rotuma Island and also IC2A operating from an Italian enclave in Switzerland (OSL via I1RBJ). I mentioned several issues ago that PA3CXC was trying to reach agreement with the appropriate authorities to mount an expedition to ST0. It seems that he has been successful, with either a late February/early March or late March/early April start date being quoted at press time. Apparently the operation will use the callsigns 6U0CW and 6U0DX and will be used to raise funds for the local people; because of this the QSL route will be direct only and donations would be appreciated, although no QSL route was known as this was prepared.

With high flux numbers in the few weeks prior to production of this column, the HF bands have been quite good on the majority of days. The LF bands were also in good shape during the lead-in to the Christmas break, with 9M8, VS6, XW8, JD1 and HL on 7MHz and W6/7 being audible in the UK over the long path on 3.5MHz. David Whitaker concentrated mainly on 7MHz and found DU9RG, EL2WK, FG5BG, FM5CD, HH7PV, JD1AMA, JD1YAA (Minami Torishima), RA0AD/JT, UD6DJ/UD6N, VS6VQ, VU2VSD, 8P6EM and 9M8PV. On 3.5MHz David heard K7UA at 1555 at a good 5 and 7.

Albert Tideswell, BRS48462, provided a fine list of DX heard on 3.5MHz early in December; these included A61AD, A92BE, JD1AMA, J6LNU, BY4SZ, KP2BH, V31BB (now ORT), HL1IUA, VK6LK, RA0AD/JT, VS6VQ, 5U7AC and 9M8PV. QSL cards received direct for 3.5MHz reports included those from A61AD, FJ/DL7FT, S79F and XF4L.

With a large number of reports, there's only space to summarize happenings on other bands without referring to individual reporters. The 28MHz band was again in good shape with A22FN, AP2DM, BV2FA, BY8AC, FK8FR, FS5R, J37AE, JD1AMA, JT1BJ, PY1DFF/PY0F, SU1RR, V31KV, XW8DX and XX9AN heard. 21MHz produced C56/ON4QM, KL7QK (Kodiak Is), TG9GI, TT8GA, V21AZL, XT2PS, ZS8MI, ZS9A (Walvis Bay - apparently he has skeds on Mondays, Thursdays and Sundays on 28.610MHz at 1615), 3C0GD, 3D2XV, 5H3RF and 8O7RN.

Once again the 14MHz band provided much of the DX on offer, most of it during the early morning or evening. Callsigns which stood out included A22EC, A35ML, CE0OGZ, FR5AI/G (who hopes to be active from Juan de Nova in May), JA4GXS/JD1, VP8BXK (South Orkneys), XT2KG, XW8KPL, ZD8VJ and ZK2VB.

On the 'new' bands Robert Small, BRS8841, added a few new countries including C31LBB, HK6IKV and J73TW on 18MHz. On 12MHz Robert found CE2EZE, LX2KO, OD5RF and V31BB.

Malcolm Hince, BRS92596, provided more details of stations he had copied on fax. All were in Europe, but it is most interesting to have a report of happenings on this mode.

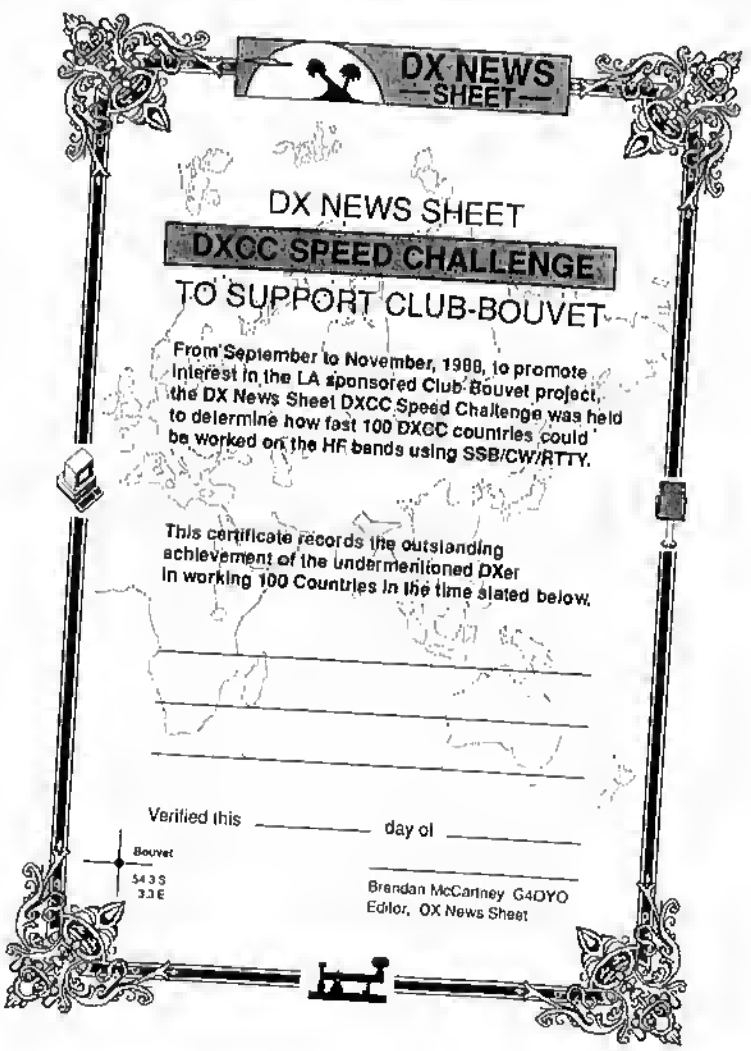
SPEED CHALLENGE

Brendan, G4DYO, has provided details of those SWLs who submitted claims for the 'Speed Challenge' to support Club Bouvet. Of 57 entries received, nine were from listeners; they were BRSs 25429, 36554, 32525, 44266, 47426; DL9753-B, DXNS0158, QNL-4513 and ONL-383. The best three entries were from David Whitaker, BRS25429, with 9 hours 37 minutes; Peter Cain, BRS36554, with 11 hours 4 minutes; and Jean-Jacques Yerganian, QNL-383, with 13 hours.

A copy of the certificate awarded by DXNS to record the achievement of hearing/working 100 countries in the shortest possible time is reproduced below.

FINALE

That's all for this month. Please keep the band reports and DX news coming in; it's most encouraging to receive your letters. Copy for the April issue should reach me no later than 26 February.



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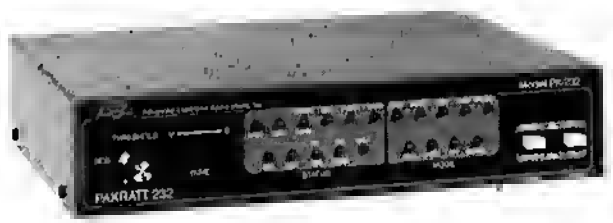

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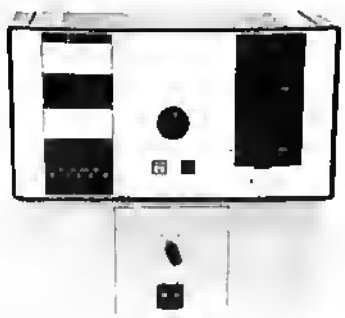

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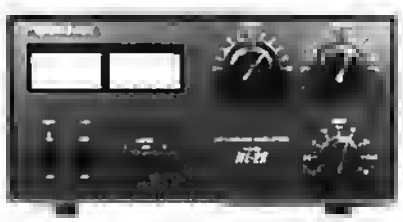

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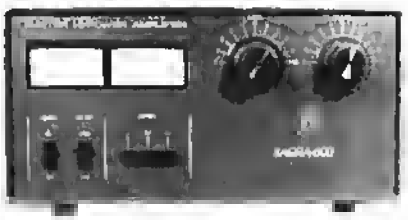

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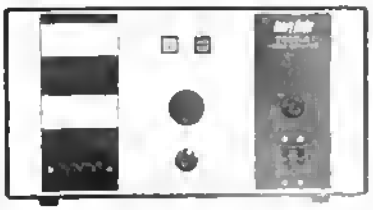

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HL160V	6m 3W in 80-160W out Rx Preamp	£249.00
HL37V	2m 3W in 32W out Rx Preamp	£ 89.00
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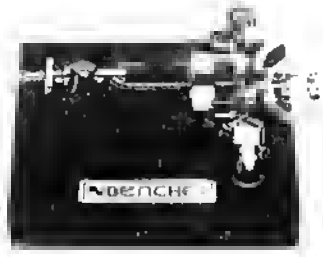

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On the Natter Net . . .

We had a great time at our Open Day on August the 19th last year, and had the pleasure of seeing a huge number of old friends and new. One old friend who is on a new venture was Geoff Arnold who many of you will recall from his days as the Editor of Practical Wireless magazine. Geoff was here to launch his new venture which is a magazine called "Radio Bygones" aimed at becoming a definitive publication on what we like to call "real radio". The first issue got off to a good start with a well written article on the R1155/T1154 equipment, and loads of superb colour photographs of historic radio gear. The second issue carries a wonderful article on the early — really early — history of amateur radio, and a series of the most stunning colour photographs of early radio equipment that I have ever seen.

If you haven't yet seen a copy of "Radio Bygones", I suggest that you have a look, and if you are very lucky you may still be able to get copies of the first two issues. I predict that this magazine will become a collectors' item in its own right, and I look forward to many more issues to come. We are, naturally, carrying copies of Radio Bygones in all our branches.

At the moment of writing this, I feel a storm brewing on the horizon with the talk of introducing formal type approval procedures, for amateur radio equipment. For those of you not familiar with the dreaded type approval, it is currently in force for most professional communications equipment such as business radio, cellular, and so on. Whilst one can see the wisdom in having a standard of performance for such professional use, the idea of applying it to hobby equipment is astonishing. If this happens, it would mean a DTI specification being drawn up (at current speed of operation that shouldn't take longer than a decade or so), followed by appointment of third party test houses to carry out independent approval checks. At current rates, a single test could cost anything up to £4,000, and if a failure is incurred, subsequent re-test would be another £4,000. I have to ask "Who will pay for this?", and more importantly, "Who will draw up the specification?".

However, providing that those drawing up the specifications at the DTI don't go completely mad, there should be no sensible objections to minimum performance requirements being instituted for amateur radio equipment. We do after all have to remember that when any of us pick up a microphone, or touch a key, we are not alone — the world may be listening and being affected by what we do. For the reputation of amateur radio as a whole, it is better to be able to demonstrate a responsible approach to the problems of EMC. The alternative may be loss of the right to operate at all.

However, if performance standards are applied to commercially produced equipment, what then happens to home made transmitters and receivers? What indeed constitutes a home made unit; does the use of a commercially produced printed circuit board make the finished unit subject to type approval?

Finding the right balance between the need for minimum standards and the need to keep the experimental aspects of the hobby alive is not going to be easy, and I hope that the eventual outcome does not work against the individual amateur radio enthusiast. If in doubt, do nowt.

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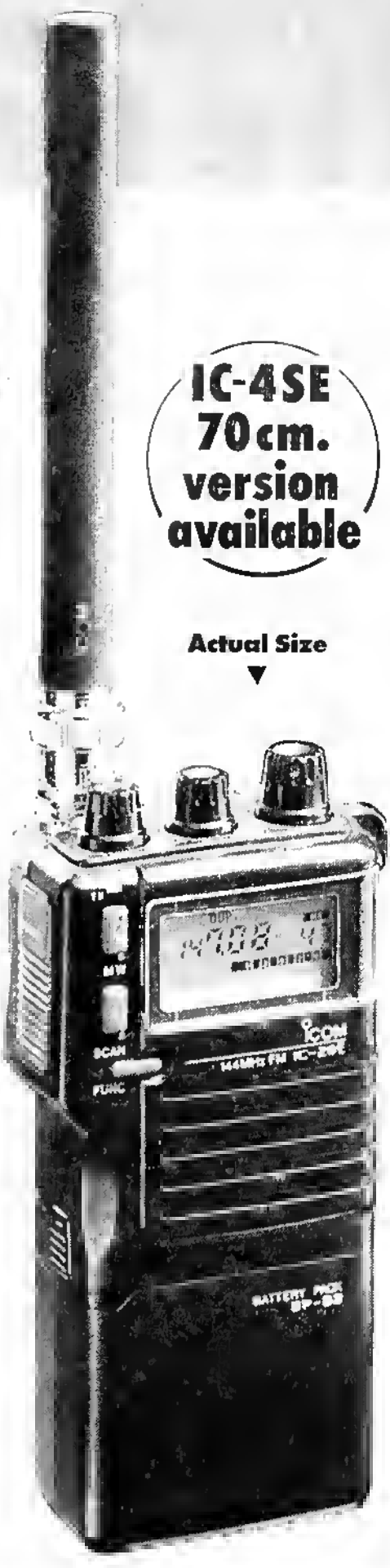

Slim and unbelievably compact.

The IC-2SE measures only 49(W) x 103.5(H) x 33(D)* mm with the BP-82 Battery Pack. Hold the IC-2SE in your hand to truly appreciate its miniature size. Weighing just 270g† with the BP-82, the IC-2SE will easily fit anywhere – on belts in shirt pockets, handbags, etc. *1.9(W) x 4(H) x 1.3(D) in. † 9.5 oz.

Simple design for operating convenience.

Even with its tremendous versatility and a wide variety of functions, the IC-2SE is easy to use. All functions are performed by a total of just six switches and three controls. The IC2SE includes both simple and multi-function modes. The result is two transceivers in one; both an easy-operation and multi-function transceiver. Simple mode ensures totally error-free operations. Multi-function mode allows you a variety of function settings depending on your operating requirements.

Other advanced features:

Reduced size doesn't have to mean reduced quality. The IC-2SE proves this with a wide variety of advanced functions.

- Tuning control on the top panel for quick QSYing.
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Options

• BA-11, Bottom Cap. Protective cap for terminals on the base of the IC-2SE.

• Battery packs and case.

BP-81	7.2V, 110mAh
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LC-55	BP-81, BP-83 or BP-86
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Convenient Repeater Functions.
The IC-2SE is equipped with programmable offset frequencies for accessing repeaters. All memory channels and a call channel store repeater information for your convenience. The IC-2SE includes a newly designed 1750 Hz tone call transmit function. A 1750 Hz tone call transmits when the PTT switch is pushed twice quickly.

Power Saver for longer operating time.
The power saver ensures lower current flow during standby conditions. Operating times are much longer than with older, more conventional transceivers.

Built-in Clock with timer functions.
The IC-2SE is equipped with an advanced 24-hour system clock with timer function. The transceiver automatically turns on when real time matches a pre-programmed time. This is perfect for scheduling QSO's. Auto power-off timers and other settings can be made in clock mode.

Convenient Scan Functions.
The IC-2SE is equipped with VFO and memory scan.
- **VFO Scan.** VFO Scan repeatedly scans all VFO frequencies. In addition, unnecessary frequencies can be skipped.
- **Memory Scan.** Memory scan repeatedly scans memory channels.

Auto Power Off Timer Function.
If you ever forget to turn the IC-2SE off, don't worry. It will turn itself off. Power-off time can be selected or deactivated using multi-function mode. Preserve battery pack power for the times when you need it most.

Priority Watch.
Why interrupt calls to check other stations? Priority watch monitors a specified station every five seconds while you operate on a VFO frequency. Continue with your communications and let priority watch do the checking for you.

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TECHNICAL TOPICS

PAT HAWKER G3VA

MORE ON SWITCHING-FET RF AMPLIFIERS

Two recent *TT* items — 'Using fast-switching power FETs as RF amplifiers' (July 1989, correction September) and '50-watts RF from low-cost FET at 7MHz' (December 1989) — have underlined the feasibility of using switching- or audio-type power FETs, such as HEXFET packages, as HF power amplifiers working at useful power levels without undue circuit complications. This month it will be shown that switching-type FETs are capable of providing substantially more power output than the 12.5 watts-per-device suggested by Doug DeMaw, W1FB in the July item which was based on his *QST* article of April 1989 (feedback May).

Wes Hayward, W7ZOI and Jett Damm, WA7MLH, in the 'Technical Correspondence' column of *QST*, November 1989 point out that W1FB encountered two major problems in using switching-type HEXFETs: (1) considerable difficulty in obtaining reliable stability; and (2) the need to use a 24V supply in order to achieve reasonable output. They believe that both these problems can be overcome: "Our experience with HEXFET amplifiers is much more optimistic than that reported by Doug DeMaw. Stability is ensured if low-resistance, non-inductive terminations are used. Useful output power is available from amplifiers with '12V' (13.5v) power supplies if a higher device quiescent current is used."

They outline two FET amplifiers: (1) an amplifier based on the IRF511 device (as used by W1FB) providing 8W CW or SSB PEP between 3.5-14MHz from a 13.5V supply; and (2) a high-power amplifier which can provide up to 50W for 14MHz CW from a 24-28V supply using a IRF530 device with a drive power of 1.5W.

W7ZOI and WA7MLH write: "Our experience with medium-power amplifiers using inexpensive FETs is very encouraging. They are generally easier to use and tame than bipolar transceivers at similar power levels. Stability is ensured by a low-impedance gate-drive design without excess inductance in series with the gate. Amplifier performance is improved when higher-voltage power supplies are used, but practical results are still possible with 12V supplies."

Fig 1 shows the circuit diagram of their 8W amplifier as used for a portable 3.5/7MHz SSB transmitter. A broadband 2:1-turns-ratio bifilar-wound transformer at the output is followed by a low-pass-filter. Quiescent bias current is about 100mA and it should be noted that no ferrite-bead inductance is used. A similar amplifier with a 50-

HIGH-POWER 'FRINEAR' LINEAR (3 x PL519)

TT, June 1989, p35, Figs 9-10 (correction September p41-42, Fig 4) included a linear amplifier designed by Frits Geerligs, PA0FRI using a single PL519 (or PL509) and providing an HF output of about 100W. PA0FRI has now sent along details of a basically similar but higher power amplifier using three PL519 valves capable of providing a full legal output of about 400W of speech-processed SSB (about 800W PEP input) with forced-air cooling.

The PSU uses voltage-quadrupling to avoid the need for a high-voltage power transformer but for safety includes a high-power 1:1 isolating transformer; this arrangement provides roughly 1250V under no-load conditions and an average of some 350mA at 1150V in processed-speech SSB or CW modes.

It must be stressed that such a high-power amplifier requires the application of good engineering practices to ensure good stability and good linearity on the higher frequency bands — and care in construction to achieve reliability and safety. While the annotated circuit diagram **(Fig 3)** provides the necessary basic information, care must be taken to use suitably rated components, adequate fan cooling, etc. Remember always that this is a high-power amplifier with potentially lethal voltages.

PA0FRI writes: "The 10-ohm cathode resistor providing RF negative feedback usefully reduces IMD products, further aided by the 22-ohm variable resistor which can absorb excess drive power. On the 7-28MHz bands it is essential to tune-out the input-capacitance of the paralleled PL519s with the input coils in order to obtain a low SWR and sufficient drive-power (7-10W across 50-ohms). The output network uses smaller components and values than those commonly specified for the 3.5/7MHz bands, but has proved quite adequate as regards efficiency, linearity and harmonic-suppression. The design incorporates an unconventional automatic protection system that is designed to prevent overdriving or instability; should such a condition occur one of the four 1N4148 diodes in the screen-grid circuit will 'blow' and the amplifier cease to function. I have modified the old-style one-valve (PCF200) transmit-receive switch by incorporating a four-diode bridge circuit to provide additional isolation in the transmit mode; the negative bias increases the non-conducting state of the diodes, creating an additional blocking pad between input and output of the amplifier.

"On-air reports received using this amplifier are proving encouraging and two-tone tests show a correct envelope pattern."

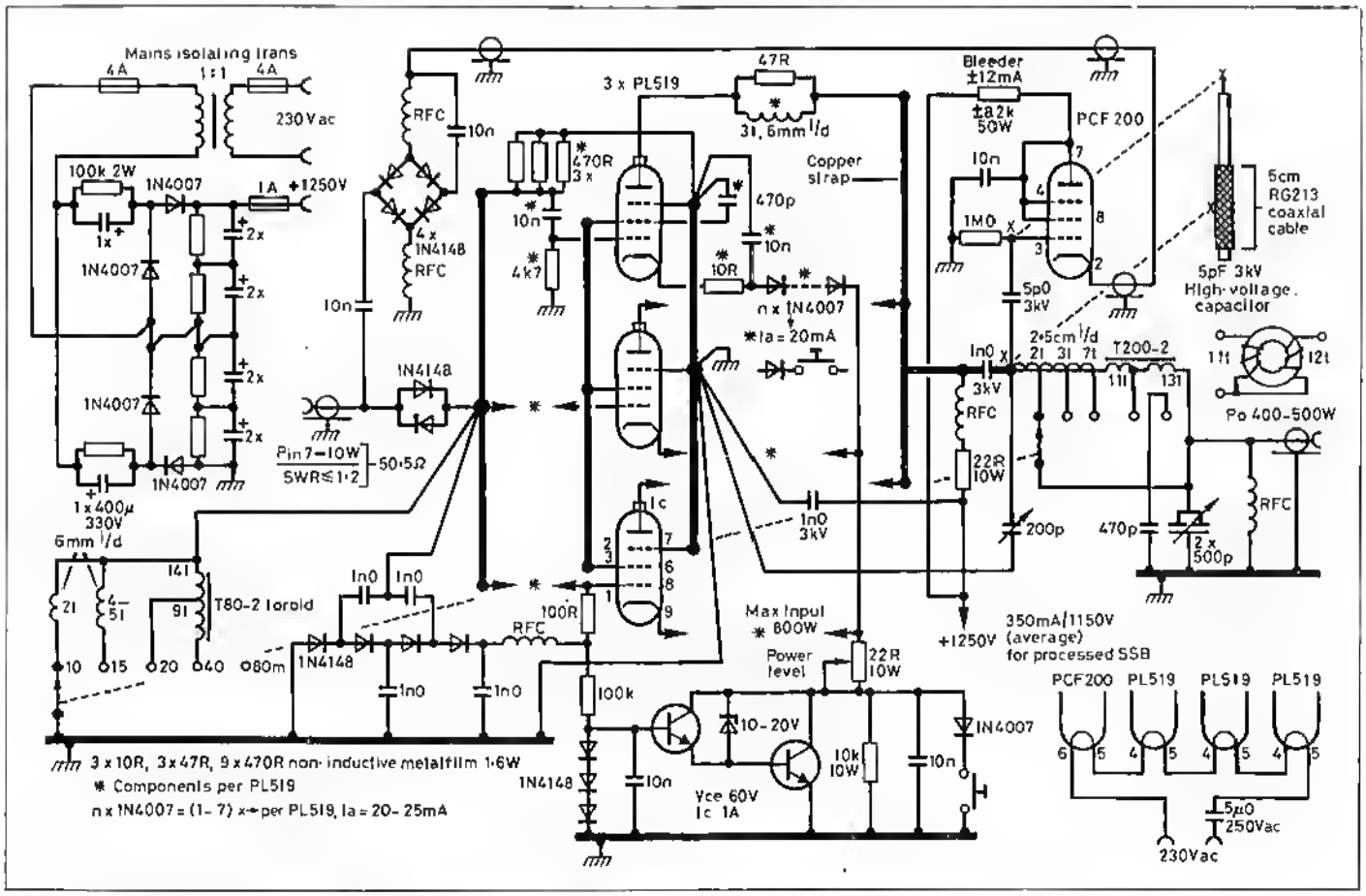


Fig 3. PA0FRI's 400W-output QSK (break-in) 'Frinear' amplifier using three PL519s capable of handling speech-processed waveforms.

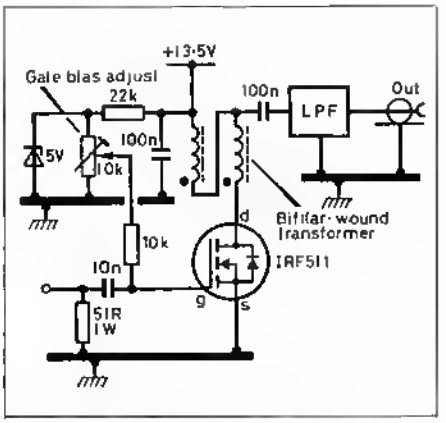


Fig 1. FET power amplifier based on IRF511 switching-type HEXFET providing about 6W CW or SSB PEP between 3.5/14MHz from 13.5V supply.

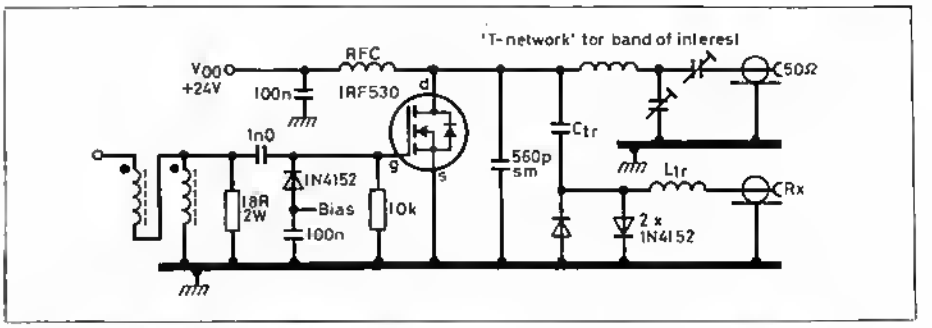


Fig 2. 50W 14MHz FET power amplifier based on low-cost IRF530 using 24-28V supply with 1.5W drive.

ohm output termination functions with a 1W output SSB driver when biased to only 25mA.

Fig 2 is their higher-power amplifier using a larger, more robust FET, type IRF530 which, in the USA, costs less than $3 new in mail-order catalogues (about £3 + VAT in UK). In this case, a 2:1-turns-ratio step-down transformer provides a low-impedance drive input circuit. An LCC T-network is used for output and matching. Both the input and output networks are roughly similar to those commonly used for similar-power bipolar amplifiers: "Part of the bias is derived from RF drive. When RF drive is removed, the drain current drops to a very low level. The internally-generated noise also drops making this circuit especially useful for QSK (break-in) CW operation (an optional T-R switch for break-in operation is shown in Fig 2 with the reactance of Ltr and Ctr each about 500-ohms).

They conclude: "The IRF530 amplifier is capable of reliable high power from a 24-28V power supply. We have measured an RF output as high as 50 watts at 14MHz with a drive power of 1.5W. Similar output power is available on 3.5W when the amplifier is driven with nothing more than a crystal oscillator. Lower, but useful, output is available from this circuit with a 12V power supply."

Outline characteristics (at 25°C) for the IRF530 (N channel enhancement) device as given in the RS Components catalogue are: case TO220(AB); P_T 75W; R_{DS}(max) 0.18-ohm; I_D(max) 10A; V_{DG} 100V; V_{DS} 100V; $V_{GS(th)}$max 4V; I_{DSS}(max) I_{GSS}(max) 500nA; tr, tf (max) 150nS.

BLINKING MAINS SUPPLIES

In presenting a 250VA DC/AC inverter for use with 24V batteries (*TT*, November 1989), I noted that this design stemmed from Papua New Guinea "where apparently there are frequent electricity blackouts." Generally, one assumes that in urban and to a lesser extent rural areas of the UK, mains supplies are pretty reliable even if, during the past decade, the London area has had its full share of lengthy blackouts. I still keep a few candles and a crystal set available as "emergency standby."

John Roscoe, G4QK, has found some unanticipated problems can follow in the wake of a supply outage even although his contingency plans worked smoothly enough when a part of Bridgwater was blacked out recently, apparently due to a cable fault: his Honda generator, resting between visits to Andorra, soon restored lighting etc.

"But" he writes, "when we got our supply back it was a mere 210V and remained so for over 24 hours. Although this breaches the statutory requirements, the local Electricity Board was not prepared to adjust the tap-changers on the local service transformer. The result was that my DRAE 24A PSU was most unhappy but, on the other hand, my Yaesu switched-mode supply coped happily and seems capable of working down to 195V on its higher tapping."

G4QK notes that the chief difference between the two PSUs is that one regulates on the secondary, the other on the primary. He wonders whether "there is any reason why PSUs of conventional, rather than switched-mode type, could not be regulated on the primary without producing ghastly waveforms."

Paradoxically, at an IEE meeting on 'Interference aspects of consumer power electronics and supply systems' it was pointed out that when a number of high-power switch-mode PSUs are used, the load comprises short-duration, high peak-currents and this can result in distorted AC waveforms being supplied to other users in the area; the short-duration pulses near the instants of peak supply voltage tends to slice-off (clip) the peaks of what should be a near sine waveform. In systems feeding numbers of Industrial SMPS the pulses are additive and heavy current waveform distortion can result. Apparently this is proving quite a problem; just as at one time when large numbers of TV sets with half-wave rectification were in operation, there tended to be a pronounced DC component on the AC supplies — a problem that no longer exists with the general use of bridge rectifiers.

At the meeting various aspects of EMC problems as they relate to the mains suplies were raised: "Connection or disconnection of energy storage elements (eg capacitors, inductors) to an electric network leads, in most cases, to the generation of signals with a high-frequency content, which can cause interference... modern techniques for the conditioning of power signals using semiconductor devices can lead to the generation of significant distortion and harmonics." A point often overlooked is that brute force RFI filters should include 'lossy' components; otherwise the unwanted RF signals will not be dissipated but will reappear at some other point from which they may be radiated. This, of course, is the rationale behind the absorptive form of low-pass TVI filter where the unwanted harmonics are separated from the fundamental by means of a cross-over network and then dissipated in a resistor; curiously the absorptive filter has never become widely used.

Peter Kendall (Electricity Council) listed some of the disturbances that can affect electricity supplies: steady voltage changes; voltage fluctuations (these for example can result in large current fluctuations in rectifier float charging of batteries even from relatively small input voltage changes); voltage dips typically caused by the clearance of system faults (these can disturb the operation of electronic equipment not designed to resist such dips); transients (spikes) which can reach several kilovolts and may destory semiconductors or alternatively may appear as a spurious signal in equipment leading to temporary disturbances to its operation.

Reverting to G4QK's comments, he raises a point of possible concern to those involved with emergency communications, Raynet etc. This is that in the absence of electricity supplies *all*

KELVIN-VARLEY NELI-POT SUBSTITUTE

Don Nappin, G3MLS, when he saw Jim Rowe's 'Substitute for a multi-turn pot' (*TT*, November 1989, p36), recognised once again the truth of the saying that there is nothing new under the sun. He writes:

"That excellent 19th-century scientist William Thomson (Lord Kelvin) in conjunction with Varley,

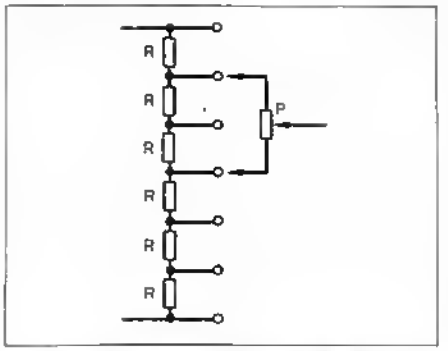


Fig 4. Kelvin-Varley classic configuration used as 'heli-pot' multi-turn potentiometer. With a chain of six similar resistors (R) and potentiometer P this provides five steps. With P = 2R there would be no overlaps. With P = 3R there would be 20% total overlap.

solved the same problem which in his case was that of making a decade potentiometer — the measuring kind rather than the component we now normally mean by the term, though the same principles apply — in a rather more elegant way than Jim Rowe, using fewer resistors.

"**Fig 4** shows the Kelvin-Varley principle. A chain of equal resistors of value 'R' are connected in series, with one more resistor than the number of steps required, is connected to a switch which allows a potentiometer of value 'P' to be shunted across any *two* resistors in the chain. ('P' may be a conventional potentiometer as shown or a further decade or set of decades as in the original Kelvin-Varley arrangement.) Now if the value of P is equal to 2R it will be evident that an exact stepped potentiometer is produced, with no overlaps. This is, in effect, the conventional Thomson-Varley or Kelvin-Varley potentiometer of constant input resistance.

"To achieve overlap between steps it is not necessary to introduce Jim Rowe's R/10 resistors, merely to increase the value of P. If, say, P=3R, then the parallel value of P and the two chain-resistors is 1.2R, thus giving approximately 20% total overlap (in practice slightly less since the total chain resistance is increased). The economy in resistors is evident and there is no requirement for a high-value pot."

modern petrol pumps cease functioning; the older pumps could be cranked by hand if necessary, but such models have long vanished in most, if not all, parts of the country.

FRANKLIN AND BUTLER TWO-OEVICE OSCILLATORS

One of the most prolific British pioneers of radio communication was undoubtedly Charles S Franklin, born in Walthamstow, London in 1879, youngest of a family of 13. He trained under a famous teacher, Sylvanus Thompson, and then in 1899 joined the Wireless Telegraph & Signal Co Ltd, the original radio company set up by Marconi with whom he became associated virtually throughout his working career. From assembling 'wireless receivers' from wooden boards, coherers, relays etc he soon departed to South Africa, pioneering military uses of radio during the Boer War. He became a sea-going radio operator/engineer and accompanied Marconi as his operator on the voyage of the *Philadelphia* in 1902 to settle the raging controversy that surrounded the reception of the 'S' signals from Poldhu in 1901 at Signal Hill, Newfoundland. It was during this voyage that Franklin became the first to notice the difference in the range of radio waves at night.

Along with Henry Round, Franklin soon became one of Marconi's most valued engineers. He was inventor of the variable capacitor (1902), ganged tuning (1907), variable coupling (1907) and then in 1913 became the first to patent the use of positive feedback ('reaction' or 'regeneration') as a means of enormously improving the sensitivity of valve receivers (British Patent Specification No 13,636 of June 12th, 1913: see **Fig 5**) a discovery he had made independently of Edwin H Armstrong in the USA who is often credited with discovering regeneration on the basis of his notarized statement of January 31, 1913 (unknown to Franklin).

In 1916, during the first World War, Franklin joined Marconi in Italy and began to experiment in the use of 'short waves' recognizing that it would be possible to beam transmissions far more effectively on short waves than on the very long wavelengths then in use. After the war this work continued in England, with the Marconi company competing with radio amateurs in pioneering long-distance communications on HF. Franklin set up an HF station on the Poldhu site for a series of experimental transmissions in 1923-24 which led to the offer by the Marconi Company to build the Empire Beam System. Franklin was responsible for both the HF transmitters and the directional antennas and also developed the first coaxial transmission lines.

As though 'reaction' (Q-multiplication) and coaxial feeders were insufficient, Franklin also developed a tunable HF oscillator akin to the Eccles-Jordan astable (multivibrator) using two valves: **Fig 6**. As noted in *TT*, November 1977, November 1977, in presenting a solidstate form of Franklin oscillator developed by BRS36760, any tunable oscillator consists in essence of two parts: a tuned circuit of high Q and a 'maintaining' amplifier to replenish the losses in the tuned circuit. A basic advantage of the Franklin oscillator is that the maintaining circuit need be only very loosely coupled to, and impose very light loading on, the resonant circuit; another practical advantage is the single two-terminal coil which has one end at RF earth, with no capacitive or inductive divider (as in the Hartley or Colpitts circuits and most of their variants) that is frequency conscious. Because of the loose coupling those changes affecting the maintaining amplifier, whether valve or solidstate, can be arranged to have only very limited effect on the frequency. Despite its many advantages, the Franklin oscillator remains virtually unknown to the bulk of American amateurs.

In the original Franklin valve circuits the two coupling capacitors were of the order of only 1pF, although later circuits, for no good reason, often specified 5 or even 10pF, significantly increasing the coupling to the tuned circuit. It is important to remember that the stability of a Franklin oscillator depends upon the quality of the LC tank circuit and the looseness of the coupling to it. With FET low-voltage devices, having greater input-capacitance and often less gain than valves, it does appear that the value of the coupling capacitors may have to be increased to about 10pF to sustain oscillation, although in 1977 BRS36760 successfully used 5pF.

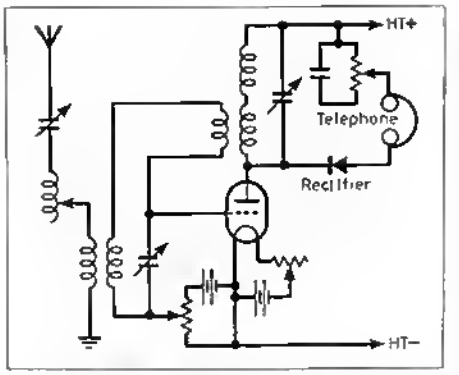


Fig 5. C S Franklin's original regenerative receiver as patented in 1913. Franklin had no knowledge of the similar work being done in the USA by Armstrong and he was the first to point out the effect of positive feedback in reducing the damping and sharpening the tuning (Q-multiplication). His work may or may not have preceded that of Armstrong. As Franklin's circuit was patented only in the UK priority was never tested in the Courts.

The latest revival of the Franklin oscillator is by Robert Armstrong, VE3RF ('An inexpensive VFO for the Yaesu FT-102', *Ham Radio*, November 1989). He writes: "I started looking for a suitable circuit. My ideal was preferably without coil taps, and certainly without parallel capacitors too big to be air-spaced... I wasn't having much luck until I came across the circuit for the Franklin oscillator in the *RSGGB Handbook*... as an external 5.0-5.5MHz VFO for my FT-102, it doesn't require any modifications to the transceiver or cost a small fortune... it uses the transceiver's digital frequency readout, works on either or both transmit and receive, and drifts so little you'll need a frequency standard to measure it." While his unit is designed specifically for use with an FT-102 using a darlington emitter-follower to step down the

3.5MHz 45W CW TRANSMITTER FOR LESS THAN $20

The W7ZOI-WA7MLH letter drew attention to a four-year-old design by Robert G Cutler of Tektronix (amateur call not given) in the 'Design Ideas' section of *EDN* (November 28, 1985, p280) which presents a crystal-controlled CW transmitter with an output power of about 45W (from 24V supply) using just two power MOSFETs. In its basic simplicity, this design is strongly reminiscent of the once popular arrangement for CW valve transmitters such as the 6V6-807 CO-PA designs. Including a low-cost 3.5795MHz NTSC colour-TV crystal, it is claimed that the component parts cost less than $20 in the USA thus helping to overcome the myth that the 'cost of entry' to HF operation is necessarily measured in hundreds or thousands of pounds. The transmitter consists simply of a keyed crystal power-oscillator/driver (Pierce oscillator), high-efficiency switching-mode (Class D) power amplifier and an output matching network matching into 50-ohm cable: **Fig 11**.

Circuit notes given in *EDN* are as follows: "In the oscillator section, an inexpensive colour-burst TV crystal determines output frequency. In addition the 700- to 1200-pF input capacitance C_{iss} of MOSFET TR2 constitutes an essential part of the oscillator's feedback — the oscillator won't operate without TR2. TR1 retains enough gain for oscillation while driving amplifier TR2 in a 50%-duty-cycle (approximate) switching mode.

"The output stage achieves 84% efficiency rather than the 50% you'd expect with a class-C amplifier. When TR2 turns off, current through inductor L3 causes the drain voltage to rise well above the 24V supply (the 100V zener diode ZD1 limits this voltage excursion) and remains high for part of the conduction cycle as well. The high drain voltage allows the FET to deliver a given amount of power with less internal dissipation and hence with greater efficiency than if the drain voltage remained constant.

"The output impedance-matching network is based on TR2's drain impedance R_{ds}, which is twice the DC value as a result of the 50% duty cycle: $R_o = V_{CC}^2/2P_o = 24^2/(2 \times 45) = 6.4$ ohms."

Note: Unlike the NTSC colour-burst crystal frequency which is inside the 3.5MHz band, a 4.43MHz PAL crystal could not be used. Use a 100V zener diode with a 100V-rated TR2. A zener diode would not be required with MTP8N18 or similar high-voltage component. Adjust the drive for minimum oscillation delay on keying.

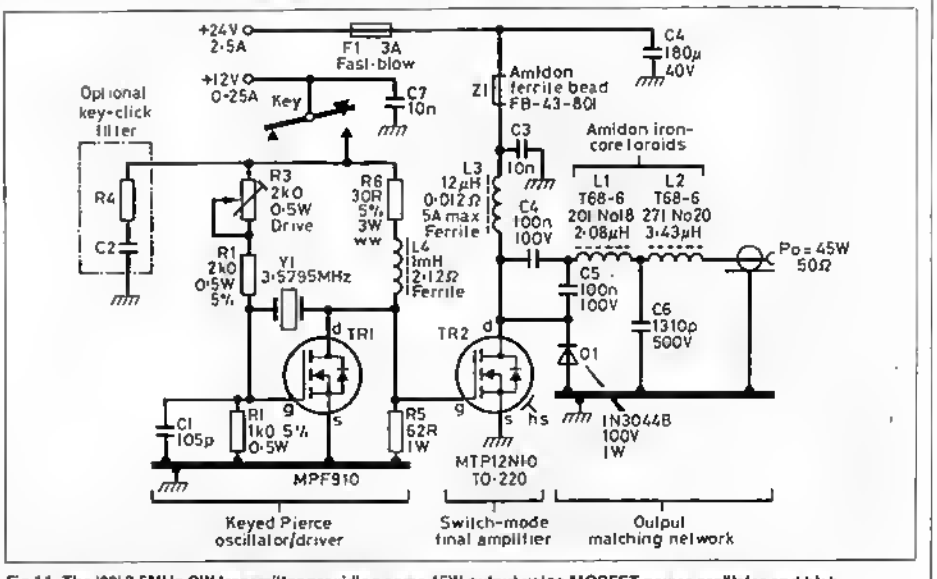


Fig 11. The '20' 3.5MHz CW transmitter providing some 45W output using MOSFET power oscillator and high-efficiency MOSFET power amplifier. Switching-mode amplifier unsuitable for SSB.

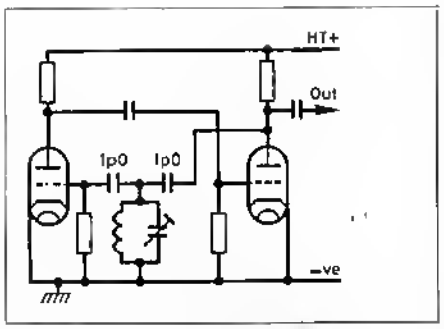


Fig 6. The basic Franklin two-valve oscillator.

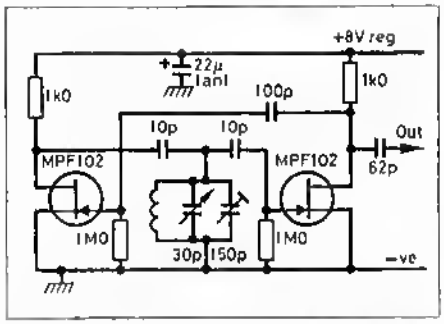


Fig 7. Solidstate Franklin oscillator as used (with buffer amplifier etc) by VE3RF.

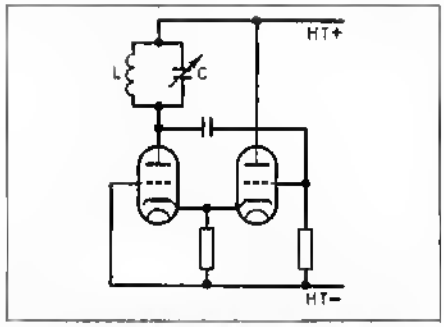


Fig 8. The basic Buffer cathode-coupled oscillator (LC circuit can be shunt-fed as in Fig 9).

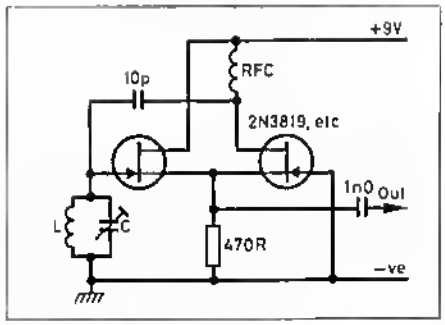


Fig 9. A solid-state source-coupled FET oscillator.

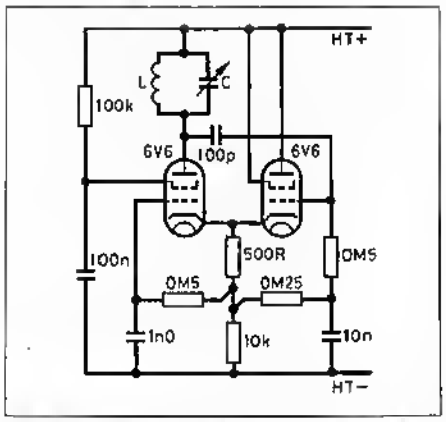


Fig 10. The original 'practical' cathode-coupled oscillator as described by Butler in 1944.

impedance from about 1KΩ (1.3Vp-p) to the 200mV p-p at 50-ohms required for the FT-102, with a lowpass filter similar to the one used by Yaesu for the internal VFO, other arrangements could be for other rigs, etc — but it seems a good idea to use an emitter- or source-follower as a buffer to reduce load variations on the oscillator. **Fig 7** shows the oscillator stage of his VFO. VE3RF used a military-surplus 6.8µH coil, 30pF (3 x 10pF) FM-broadcast tuning gang with a 150pF air-spaced, screwdriver-adjusted trimmer to set the tuning range. He recommended the 10pF coupling capacitors should be high grade, preferably silver-mica units although he feels ceramic disc would probably do (my suggestion would be to try 5pF as starters). It would probably be wise to avoid using electronic tuning diodes in such an application.

A later derivative of the Franklin circuit is the Butler cathode-coupled oscillator **(Fig 8)** first described by the late Frederick Butler (RAF/GCHQ) in *Wireless Engineer* (November 1944). He then summarised the advantages of his oscillator as:

(1) Alteration of frequency range can be made by inductance changes, using a single pole switch. No reaction windings or tapped coils are employed.

(2) The high input-impedance of the cathode-follower valve (source-follower FET) imposes light loading on the tuned circuit.

(3) Unity gain in this stage provides ample driving voltage to ensure reliable oscillation (from AF) up to very high frequencies, even when using tuned circuits of low Q value.

(4) The series (anode) circuit can be replaced by its shunt-fed equivalent (as in **Fig 9**). In either case one side of the tuned circuit is earthed as regards RF potential.

(5) Triode or pentode valves may be used...

His 1944 article included a practical circuit based on two 6V6 valves (possibly not the optimum choice unless appreciable output is required): **Fig 10**. With the tuned circuit directly connected to one of the active devices, one may be losing one of the good points of the original Franklin arrangement — but either can provide excellent tunable oscilators and both seem well-suited for use with FET solidstate devices rather than valves.

Provided due care is taken in design and construction, such oscillators should prove adequate for most HF purposes. For those cases where continuous tuning is needed with drift-free stability of just a few Hz, Klaus Spaargaren, PAoKSB has developed a new form of his 'hull & pull' locked oscillator using a variable crystal oscillator (VXO) as the reference 'timing' oscillator, 'pulled' over just a few kHz but able to stabilise with a sample-and-hold IC an LC oscillator tuning continuously over a range of say 500kHz. This seems a most ingenious arrangement but is fairly complex and will need to appear in 'instalments' over several months.

MESNY — A FRENCH PIONEER

H R Mesny, GJ3LFJ, noted with interest the references (*TT*, June 1989, p33 and November 1989, p38) to the 1920s push-pull oscillator of his namesake "(R) Mesny." In the June *TT*, I mentioned that neither G8FEQ nor I had traced anything further of his work, though in my case I had forgotten that in *TT*, January 1977 I included a diagram of the Chireix-Mesny HF beam antenna that was developed in France as an early alternative to the original Marconi-Franklin beam arrays made up of large numbers of 'uniform' vertical dipoles. At that time I noted: "In the Chireix-Mesny array the ½λ dipoles are disposed in the form of saw-teeth, rather like a series of 2λ quad elements. This has the advantage over the Franklin

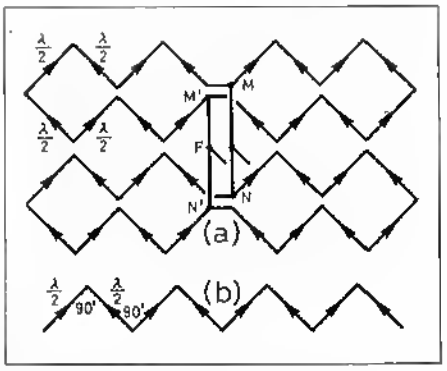


Fig 12(a). Large Chireix-Mesny array of half-wave dipoles arranged in saw-tooth configuration and providing vertically-polarized signals with broadside directivity. Might have application as fixed beam on VHF/UHF.
(b). Simplified Chireix-Mesny array which can be end-fed; such 'zig-zag' arrays have been used at VHF/UHF for TV broadcasting.

array that each dipole element may be driven directly by the one preceding it. **Fig 12(a)** shows a large Chireix-Mesny array which would require vast space for HF but might be well worth investigating for VHF or UHF. From the point of view of the radiated field, such a sawtooth network is equivalent to an array of parallel dipoles. **Fig 12(b)** forms the basis of the 'zig-zag' antennas used at VHF/UHF for television broadcasting."

GJ3LFJ traced a reference to the Chireix-Mesny beam in *The Radio Engineers Handbook* by Henney. He recalls that some years ago the late Max Tourniquet de Brandt, F5HJ mentioned that Mesny was still well remembered and respected in France for the work he did as an engineer in the French Army. He was responsible, with others, for introducing radio communication in the French forces before and during the First World War.

I can now add a further reference. Elizabeth Antebi, in her massive *The Electronic Epoch* (Van Nostrand Reinhold, 1982) in discussing the parallel development of radar in many countries writes: "In France, Henri Gutton and Pierret began to experiment with (very) short waves; and Maurice Ponté, who had been working with Gutton, Sylvain Berline and Hugon at the CSF Laboratory, since 1930, began his work on the magnetron. In 1931, Mesny and David, technical consultants for the French Military Signals Department, noted that a disturbance was created in communications whenever an aircraft passed through the zone between the transmitting and receiving stations. At the beginning of 1934, the first equipment using returning radio wave echoes to locate a moving obstacle was produced..."

Without detracting from the value of the break-through made by J T Randall and H A H Boot in demonstrating the first high-power 10cm cavity magnetron at Birmingham University in early 1940, and the important role of the French team, we should also be proud of the part played in this work by Eric Megaw, MBE, DSc, GI6MU/G6MU, a former RSGB Council Member and contributor to the old *T&R Bulletin*. He worked on magnetrons at the GEC Research Laboratories in the 1930s, liaised with Henri Gutton and was the man chiefly responsible for turning the experimental Birmingham magnetron (which worked directly on its vacuum pump) into a production device. He had an E1188 cavity magnetron designed and made in collaboration with Birmingham working by 16 May 1940 producing 500W CW or pulse at 10cm. Previously, in collaboration with HM Signal School, he had been able to obtain 1.5kW pulse output from a segmented magnetron at 37cm. A most notable British professional scientist who was also a keen amateur.

USING LOW-VOLTAGE-DROP IC REGULATORS

It is generally agreed that the weakest link in the hand-held transceiver chain is the battery, whether disposable dry batteries with their high running costs or rechargeable nicad batteries with their problems of high self-discharge and rapid deterioration unless correctly used and with a suitable charger. Although the nicad battery should last for several thousand charge-discharge cycles this is not often achieved in practice without incurring the so-called 'memory effects' that limit its usefulness.

An article 'An adaptor for powering hand-held rigs from 12V sources' by Mitchell Lee, KB6FPW of National Semiconductor (*QST*, November 1989, pp17-21) suggests that lead-acid power sources, including car battery vehicle electrics or 12V gelled-electrolyte batteries, are more versatile than the original batteries for hand-held units, when used with a suitable adaptor. Gelled batteries are available with capacities from about 1Ah (size of a very large nicad battery) to 40Ah (small-car battery size). Units of up to about 2.5Ah are of a size and weight that make them suitable for an effective battery belt for portable operation. Since leclanché, nicad and lead-acid batteries all have different on-load voltages and different discharge curves, it will usually be necessary to use a voltage regulator when powering a hand-held transceiver from an external power source.

While conventional NPN adjustable IC regulators such as the LM317 can be used to provide, for example, 10.8V at up to 1A they require external protection if used in conjunction with a vehicle source to cope with the high transient voltages and also need at least a 1.7V input-to-output voltage differential to maintain output regulation.

KB6FPW draws attention to the advantages offered by the new low-dropout LM2941T IC regulator, based on a series-PNP pass-device and with freedom from some of the delicacy problems associated with the usual NPN regulators such as the LM317. With the LM2941T the drop-out point is simply the saturation voltage of the PNP pass device, viz only 270mV at a load current of 0.5A. Additionally no extra headroom is required to operate the error amplifier and voltage reference since these sub-circuits are powered from the full input voltage and not from the input/output differential. Furthermore there is no need to use a series blocking diode and, better still, PNP pass devices can withstand 60V transients, eliminating the virtually mandatory for an external, power-consuming, transient-suppression network. **Fig 13** shows a regulator based on the LM2941T with adjustable voltage output suitable for powering a handheld transceiver from a car or sealed lead-acid battery.

KB6FPW's five-page article provides a detailed explanation of the advantages of and application notes for the LM2941T, together with basic information on IC voltage regulators used for battery adaptors. Tables 1 and 2 have been extracted from his article. **Table 1** indicates the value of R2 in Fig 1 used to adjust the output voltage based on the type and number of the cells to be replaced. **Table 2** gives a summary of the basic features of NPN and PNP IC regulators. He also emphasises that lead-acid batteries have a built-in charge indicator in their open-circuit (unloaded) voltage; a facility that is not available with nicad batteries where the voltage discharge curve remains nearly flat over much of the discharge (the reason why it is difficult to use a voltage-operated controller for nicad charging). He also notes that: "Open-circuit voltage is directly affected by the specific gravity of the battery's electrolyte, which in turn varies with battery type. Signalling batteries designed for standby service typically have lower electrolyte specific gravities than deep-discharge batteries, resulting in slightly lower output voltages for the signalling types. For exact output voltage figures for your battery, check the manufacturer's specification sheet."

No of cells NiCd (1.2V)	Leclanche (1.5V each)	Total voltage	R2 (without trimmer)	R2 (with trimmer)	R3
5	4	6.0	3K74	3K3	2R2
6		7.2	4K64	4K3	1R0
	5	7.5	4K87	4K3	1R0
7		8.4	5K62	5K1	OR47
	6	9.0	6KO4	5K6	OR33
8		9.6	6K49	6K2	OR22
9		10.8	7K5	6K8	OR1

Table 1. Values for R2 based on type and number of cells to be replaced. R1 is 1KO, 1% tolerance, metal film, 0.5W.

Characteristics	NPN (LM317T)	PNP (LM2941T)
Short-circuit current limit	Yes	Yes
Thermal shutdown	Yes	Yes
Over-voltage shutdown	No	Yes
Reverse-battery protection	No	Yes
Dropout at: 50mA	1.6V	60mV
500mA	1.8V	270mV
1A	2.0V	500mV
Maximum input voltage	40V	60V

Table 2. NPN and PNP regulators: features compared

PROTECTING POWER TETRODES

An article by Mark Mandelkern, KN5S (*QST*, November 1989) on 'Protecting power tetrodes' in amplifiers using conventional screen supplies includes some general advice that seems worth drawing attention to: "For tetrodes, screen current is the best indicator of resonance and loading conditions. Don't try to tune for a plate-current dip. Resonate tetrodes by tuning for maximum screen current. In a stable, grid-driven tetrode amplifier, resonance and peak output are indicated by a peak in screen current. Adjust the loading until this screen-current peak is the value that yields maximum RF output. After you find the settings for maximum output, increase the loading so that the output at resonance is 5-10% less than the maximum available. (That last step produces a narrower signal!)... I suspect that some of the bad press that tetrodes have received is simply due to overdrive and improper tuning. Dave Meachan, W6EMD said it best in a *QST* article ('Understanding tetrode screen current' *QST*, July 1961, pp26-29): 'Never tune a tetrode for maximum output.'" □

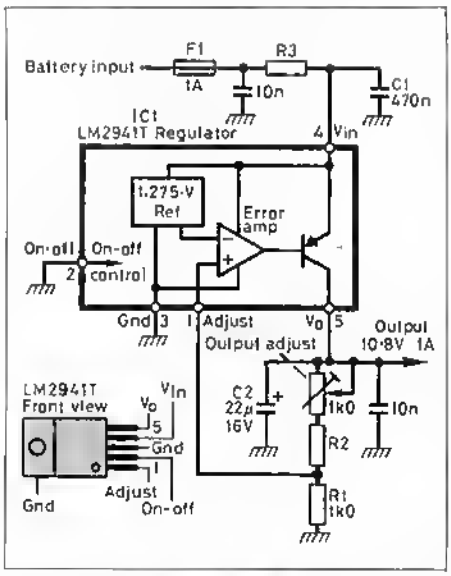


Fig 13. LM2941T PNP regulator for hand-held units etc. Output voltage is set by R1 and R2. R3 (2W wirewound) is optional but provides RF filtering and helps to dissipate some power with high input voltages. The 1KO trimmer is optional but permits fine adjustment of voltage output. Do not decrease value of C2 below 22µF or there may be instability. R1, R2, 1% metal-film resistors. R3, 5% wire-wound rectangular resistors. For values see Table 1.

TIP FOR ICOM IC-2A OWNERS

A useful tip and warning for IC-2A owners comes from David Barneveld, VK4BGB (*Amateur Radio*, June 1989, p19):

"For those who own an IC-2A handheld and its companion fast charger, the BC-30, one does not have to be told of the convenience of slipping the whole unit, complete with battery pack, into the charger and commencing a recharge cycle.

"But beware! Having not removed the battery pack from my transceiver for some months, I was intrigued that when I went to replace it with another pack, I could barely slide it more than 3mm without it binding in some place. My attempts at gentle persuasion failed to get it to budge.

"The cause of the problem turned out to be that one of the screws in the bottom of the transceiver proper had worked its way out, and was catching on the battery pack as it was moved across. As one cannot get the back off, how do you screw back the screw?

"The answer is that the two screws on the back must first be removed and then, ever-so-gently, the case is prised apart just enough to allow the battery pack to be lifted clear of the runners. After removal, check the tightness of all the other screws in the bottom plate. Don't let it happen to you!"

WHITE ROSE RADIO

In this month's cover feature, John R Hey, G3TDZ, describes an inexpensive and easy to build receiver of elegant design.

The receiver described is named after the White Rose Amateur Radio Society, fifty of whose members have had a go at its construction; for many, this was their very first venture into radio construction. At a long established custom called 'Bash the Committee' night, it was requested that a home construction project be devised. Stunned silence was the first response to the announcement that it was to be an all band CW/SSB transmitter and receiver: 'Has 'TDZ gone raving mad?' they asked.

The first part of the project was to design the stand-alone receiver described here. It was intended to be built by inexperienced members, and particularly so as to allow Class B members to get their first taste of HF. Some of these same people had remarked that there was little point in struggling with the Morse, only to be faced by a £1000 brick wall at the end, so the receiver had to be low-cost. The final cost of our receiver is estimated at between £25 and £30, and I promised to design a matching transmitter in time for next winter's construction season.

To date, over a dozen receivers have been successfully completed, in construction styles varying from Rolls-Royce to rat's nest - all of them worked.

DESIGN PRINCIPLES

For simplicity, I planned to design a direct conversion receiver rather than a superhet. To avoid the necessity of huge switched coil packs, which are difficult even for experienced constructors, plug-in converters for each band seemed easier. In other words, the direct conversion part of the receiver operates as a 'tunable IF' which follows a plug-in converter. Thus, as everyone has their favourite bands, constructors could pay only for the converters of their choice, and more bands could be added later as interest and finances allowed. This technique also allowed some optimization in front-end design for each band, both for good performance and low cost. Component costs for the converters range between £3.60 and £6, depending on crystals and the number of stages.

The direct conversion receiver has been around for some time, but often performs poorly and is not taken seriously. The basic problem with most direct conversion receivers is that they are drastically over-simplified. 'Keep it simple' they say - yes, certainly - but not at the expense of poor performance. So let us look at these criticisms and see if the faults can be rectified.

Deafness

Many circuits seem have used the well-known Schottky ring mixer and no RF stage. The consequent conversion-loss with no RF gain can often result in poor signal-to-noise ratio, even if sufficient audio gain is used afterwards and usually this too has been lacking. Our design employs an active balanced mixer, having a useful conversion gain which is preceded by a gain controlled cascode RF stage capable of producing a further 26dB of gain. Already this is beginning to look like a real receiver, not a toy.

Poor Stability

Although drift and other forms of instability can affect any type of receiver which does not use a crystal-controlled synthesiser, this criticism has become particularly attached to the direct conversion receiver. The reason is that people have interpreted the KISS principle (Keep It Simple, Stupid) to mean 'Keep It Stupidly Simple' and have often failed to take even the most elementary steps towards good frequency stability. This receiver does it properly.

Poor selectivity

This usually means too much extraneous noise caused by inadequate filtering. Our circuit uses a fifth order low-pass filter for SSB, plus a further band-pass filter for CW, which take good care of that problem.

Direct rectification

This is the 'Radio Moscow' effect, in which powerful broadcast stations appear right across the band. This can be troublesome, but has been overcome by using a balanced mixer with a potentiometer adjustment to set the balance spot-on. In addition, twin-ganged tuned circuits act as a pre-selector to protect the mixer against unwanted signals elsewhere in the band.

No RF gain control or AGC

This receiver is provided with both.

The audio image

I have to agree that the detection of signals either side of zero-beat is a problem not shared by more complex supernet receivers. A previous 80m transceiver project used the phasing method to eliminate the unwanted sideband, but

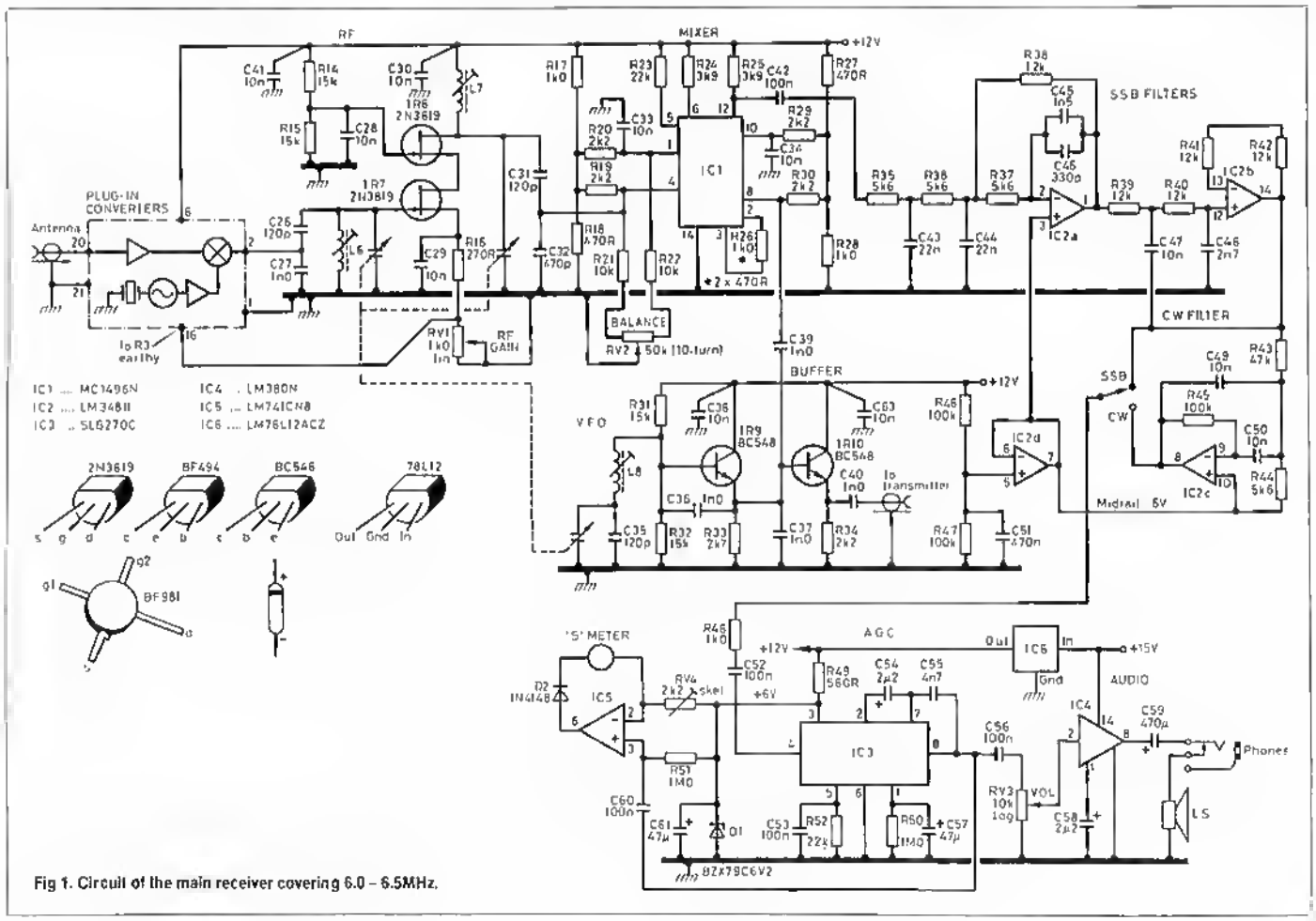


Fig 1. Circuit of the main receiver covering 6.0 – 6.5MHz.

although this was effective, it didn't seem worthwhile to add the extra circuitry, alignment and cost. We decided to live with the audio image for this simple receiver project.

MAIN RECEIVER

The main receiver (**Fig 1**) does not cover an amateur band but acts as a tunable IF for a series of crystal controlled amateur-band converters. The main advantage of choosing a tuning range of 6.0 - 6.5MHz is that all the crystals for the various converters (except 70MHz and 144MHz) are cheap off-the-shelf computer types. The most expensive was £3 for the 50MHz converter while some were as cheap as 98p. A further advantage of a tunable IF in the 6MHz region is that it is high enough to provide good image rejection with converters operating up to 144MHz. You may be aware that 6MHz contains some rather powerful broadcast transmitters, and to avoid breakthrough the connection between the converters and the main receiver is a short length of well-screened 50Ω cable.

The whole receiver is housed on one double-sided printed board measuring 3" × 4" (**Fig 2**). The tunable IF amplifier uses two 2N3819 FETs in a cascode configuration with an RF gain control in its tail, and is fairly bomb-proof. There are two gang-tuned circuits at 6.0 - 6.5MHz, which also help to reduce direct rectification of signals elsewhere in the band. An MC1496 double-balanced mixer follows, and has a multi-turn trimmer for precise balance adjustment. Local oscillator injection is from a simple Clapp VFO, which has a buffer amplifier capable of feeding the companion transmitter and a digital frequency readout. It is essential that the capacitors used in the VFO are of good quality: C36, C37, and C39 are all C0G or X7R multi-layer, rather than cheap ceramics whilst C35 should be polystyrene or a good quality silvered-mica component.

After the mixer, there is a third order Butterworth low-pass filter, followed by a second order Chebyshev, both with a cut-off frequency of 2800Hz. If you prefer a lower-frequency cut-off, increase R35, R36 and R37 to 6.8kΩ, and C46 to 390pF. Output from the second low-pass filter goes to the SSB position on the front panel mode switch and for CW, a further band-pass filter is added at 700Hz, although its exact frequency may be altered by varying R44. A quad op-amp provides all three active filters, the fourth section being used to develop a bias voltage for the other three.

The SSB/CW selector switch then passes the signal to IC3 where up to 60dB of audio gain is available. An SL6270 VOGAD chip is used to provide a simple but very effective ACC system which offers a very fast attack time with a decay rate determined by the values of R50 and C57. The audio gain control then follows, which feeds the AF to the output stage, an LM380.

For no better reason that to make the front panel look good, a simple S-meter driver is included

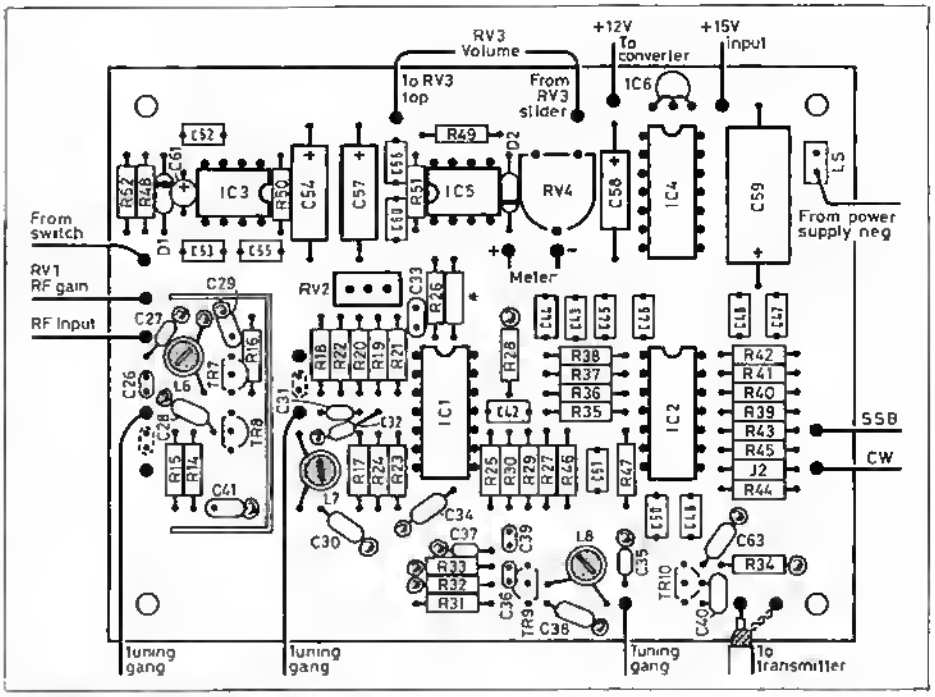


Fig 2. Component placement main receiver board.

which uses a 100μA movement. The 6V voltage reference for the S-meter circuit is provided by a Zener diode D1 bypassed by C61, this arrangement also fulfills the VOGAD IC 6V supply requirement.

Mains power was decided upon, and **Fig 3** shows the circuit and layout. Alternatively, an external stabilized 13.8-15V 1A power supply may be used, or batteries for portable operation. The 12V regulator IC6 supplies all stages except the audio output, which runs from the higher-voltage supply line.

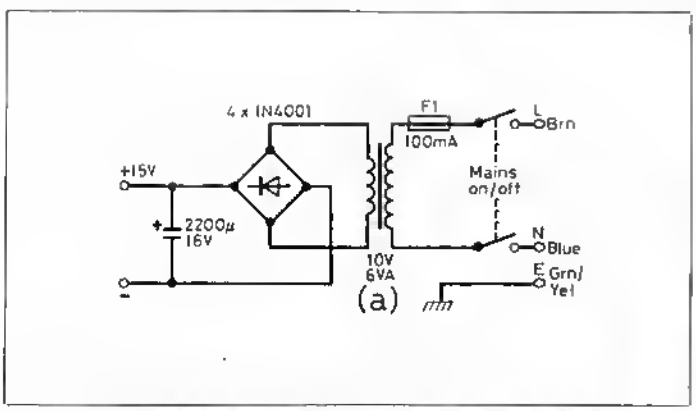
CONVERTERS

The signal path is essentially the same in all the converters, from 3.5MHz to 144MHz; only the component values change with frequency, **Fig 4** to **6** show the circuit details. An RF amplifier with huge gain is not essential, in this application a modest amount of gain (about 12dB) is provided, its main purpose being to provide isolation between the local oscillator and the antenna. Each converter has three tuned circuits at signal frequency, and the RF Amp also serves to introduce a degree of isolation between them. From 3.5 to 70MHz, the RF amplifier is a cascode-connected pair of inexpensive 2N3819 JFETs, and the 144MHz converter uses a BF981 dual-gate MOSFET which may be regarded as a 'cascode on a chip'.

Overloading of mixers by strong signals has to be avoided, and the MC1496 in the direct conversion part of the receiver is especially vulnerable since the signals arriving at the antenna have been amplified by the time they reach that stage. AGC is not the answer, for how would an AGC detector know that the mixer had been overloaded? An RF gain control or attenuator is the answer and the source resistors of the cascode amplifiers in both the converter and the tunable IF are connected to a 1KΩ potentiometer which provides about 30dB of manual gain control. Tests by both the RSGB reviewers and myself showed that careful use of the RF gain control can almost completely eliminate direct rectification of strong signals, but the maximum available gain on the lower bands was excessive in the prototype converters. Therefore the fixed source resistor R23 has been increased in the 3.5 - 10MHz units so as to leave the maximum gain at a more comfortable level.

The oscillator injection for the various converters presented a challenge in that a simple fundamental crystal circuit was ample for the lower bands, but an overtone circuit was needed for the 28, 50 and 70MHz converters. To use an inexpensive crystal for 144MHz, an overtone-plus-multiplier system was required which is where those fiendish folks at the White Rose Radio Club exercised their little grey cells. It was found possible to design a single PCB which would accommodate every variation in oscillator chain configuration. This enabled us to order 300 copies of the same board, thus significantly cutting costs. The diagrams show only the components required for the individual bands; all other holes are left unused.

The mixer in all converters is a BF981 dual-gate MOSFET, with injection into gate 2. To avoid the



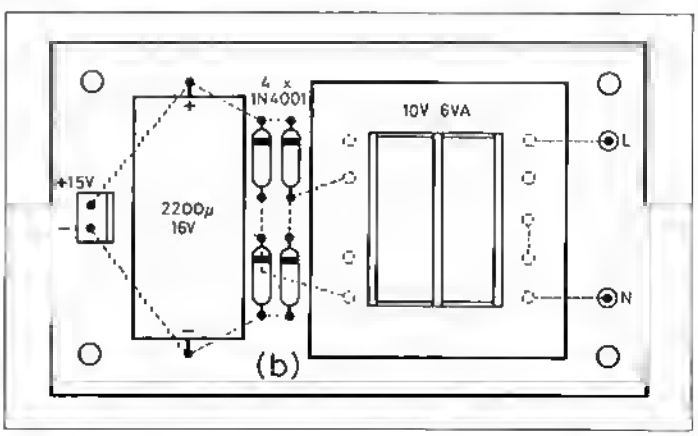


Fig 3. Circuit (a), component placement (b) of the mains power supply board.

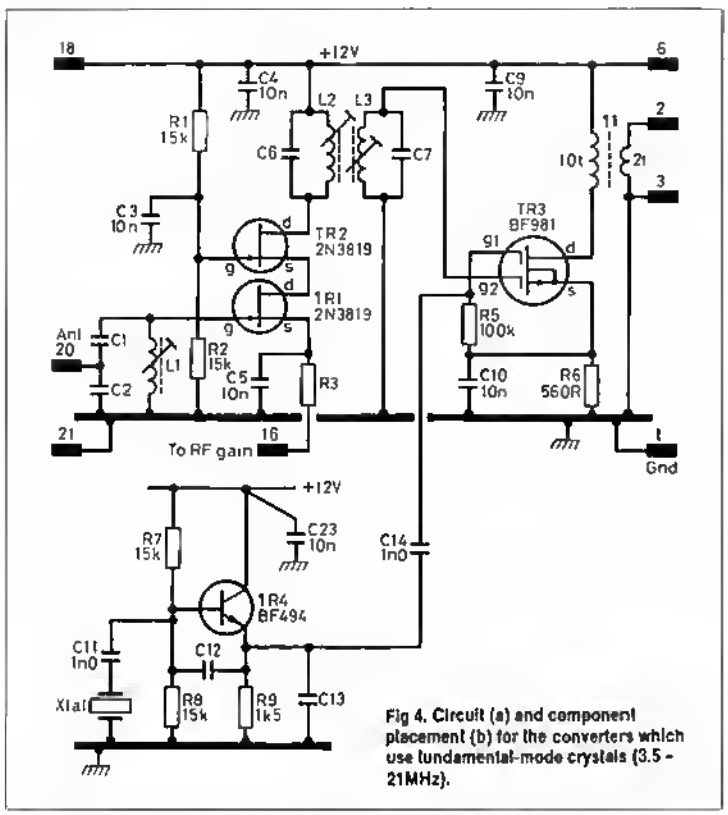
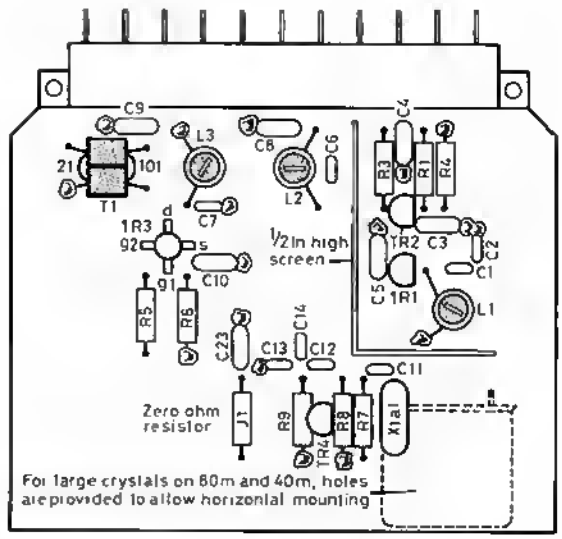


Fig 4. Circuit (a) and component placement (b) for the converters which use fundamental-mode crystals (3.5 - 21MHz).



CONVERTERS USING FUNDAMENTAL MODE CRYSTALS

	80	40	30	20	17	15
Xtal	2.5MHz	1MHz	4MHz	8MHz	12MHz	15MHz
C1	220p	120p	68p	56p	47p	39p
C2	1800p	1000p	560p	470p	390p	330p
C6,7	220p	120p	68p	56p	47p	39p
C12	390p	470p	220p	120p	100p	82p
C13	560p	680p	330p	180p	150p	120p
R3	470	390	330	270	270	270
L1,2,3	44t	31t	28t	22t	16t	14t

need for tuning in the converters, the output coupling to the main board is via a wide-band transformer.

CONSTRUCTION

Fig 7 shows a suggested general layout of the chassis base, front and rear panels, mainly as an idea rather than something which must be followed to the letter. Most of the White Rose constructors have copied or followed the basic layout suggested, with variations based on wooden boxes and biscuit tins. Most parts can be made from 18 gauge aluminium, though a heavier gauge is recommended for the front panel. The 'production' version varies from the prototype, in that the converter slides in horizontally. This simplifies the metalwork and also allows the loudspeaker to face the front, which is always a good idea. Many amateur home-brew projects are spoilt by using old rusty cheese-head screws, or even worse, tarnished brass round-heads. Treat yourself to a packet of nickel plated 3mm pan-head screws with matching nuts and non-slip washers for a more professional finish.

The multi-pole connector for all the converters is a 21-pole 'DIN41617' the type with two staggered rows of pins. You need one socket, plus as many plugs as the number of converters you propose to build. These are obtainable at raffles for as little as 25p, and even the full professional price is less than £1 each. The converters slide into the main chassis on Vero PC guides; one guide cut into two halves will suffice.

When assembling the boards, cut the component leads short and make the connections carrying RF run directly from point to point. Where the layout

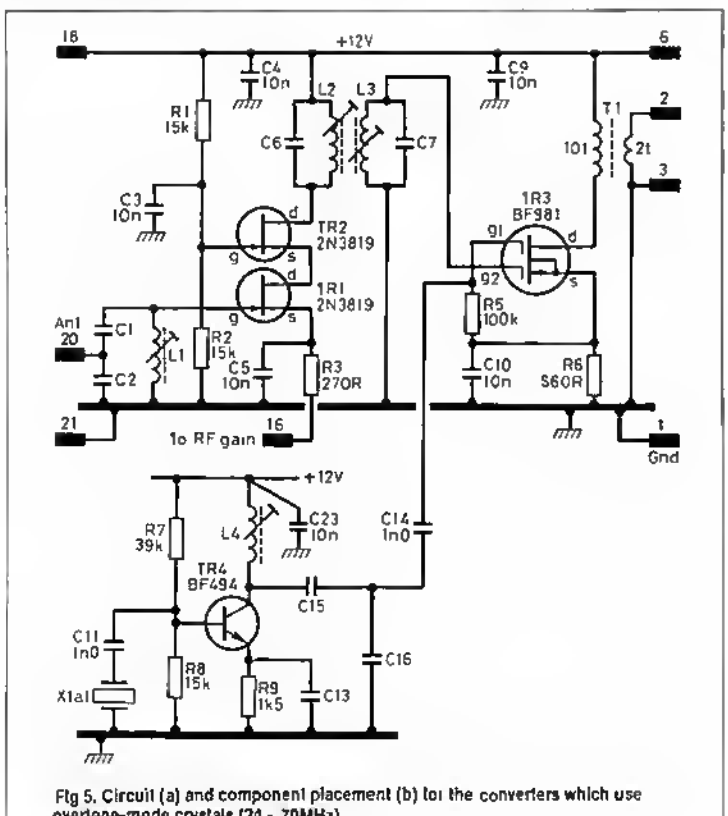
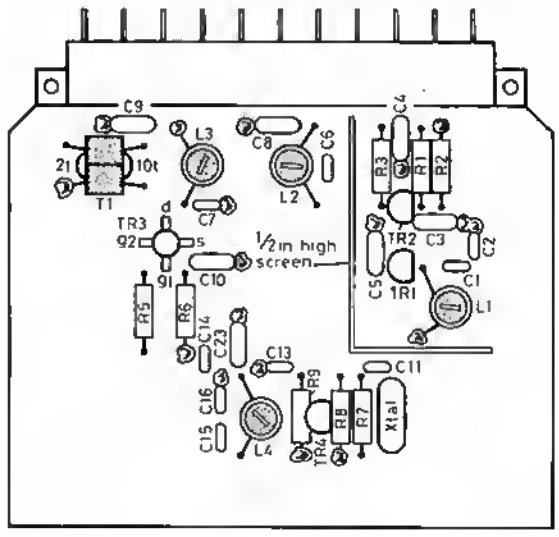
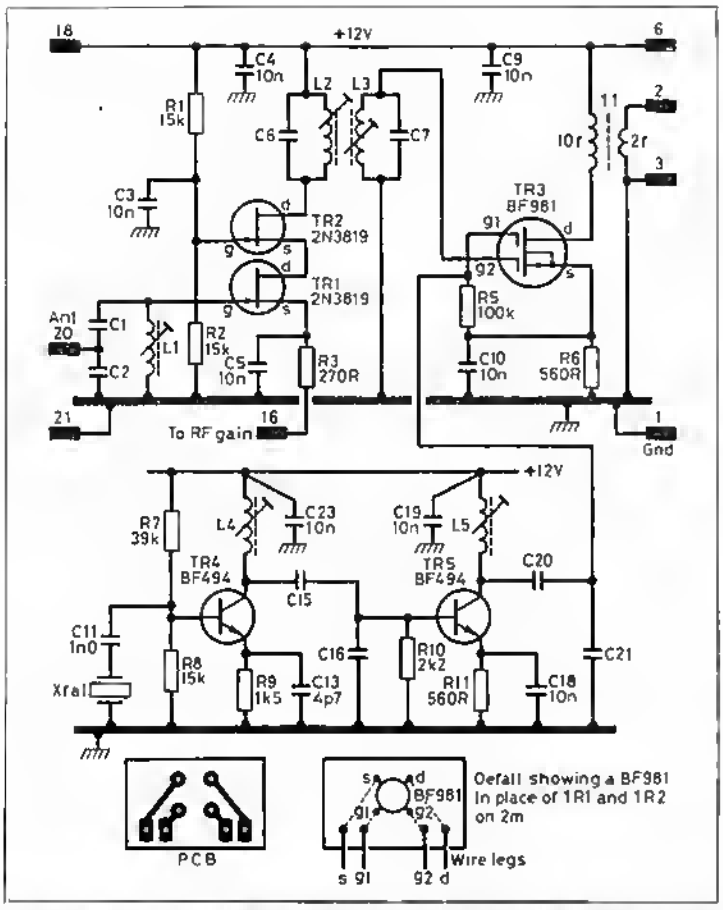


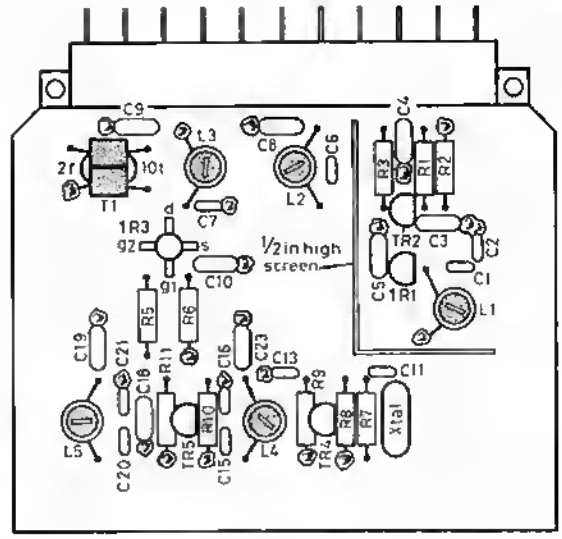
Fig 5. Circuit (a) and component placement (b) for the converters which use overtone-mode crystals (24 - 70MHz).



CONVERTERS USING SINGLE STAGE OVERTONE OSCILLATOR

	12	10	6	4
Xtal	18.5MHz	22MHz	44MHz	64MHz
C1	33p	27p	15p	10p
C2	270p	220p	120p	82p
C6,7	33p	27p	15p	10p
C13	5.6p	5.6p	4.7p	4.7p
C15	39p	39p	18p	12p
C16	150p	150p	68p	47p
L1,2,3	13t	12t	9t	8t
L4	20t	19t	13t	9t





CONVERTERS USING OVERTONE OSCILLATOR AND MULTIPLIER

	6	4	2
Xtal	22MHz	32MHz	46MHz
Mult	x2	x2	x3
C1	15p	10p	5.6p
C2	120p	82p	47p
C6,7	15p	10p	5.6p
C15	39p	22p	18p
C16	150p	100p	58p
C20	18p	12p	5.6p
C21	68p	47p	22p
L1,2,3	9t	8t	4t
L4	19t	16t	12t
L5	13t	9t	5t

Fig 6. Circuit (a) and component placement (b) for the converters which use overtone-mode crystals and a frequency multiplier (50 - 144MHz). This circuit may be used for 50MHz and 70MHz if suitable crystals are not available for Fig 5.

shows little splodges, component leads are soldered directly to the upper foil - the use of IC sockets is recommended and are well worth the expense. Screens are shown on both the main board and on the converters; these are made of tinplate 1/2in tall and are soldered to the upper foil.

All coils are made from enamelled copper wire, close wound on formers of 3/16" (4.8mm) diameter, which are fitted with dust iron tuning slugs – see coil tables for full details. Old TV sets are a good source of both formers and wire, or the formers may be purchased from Maplin (former 722/1 with dust core type 4). If the specified gauge of wire is not available, use the next nearest size. The coils for 10MHz and below will probably need to be wound in two layers, according to the actual gauge of wire you use; if the winding length would be greater than twice the coil diameter, come back on a second layer. All coils should be coated with coil varnish or polystyrene cement to fix the windings in place.

WIDE-BAND TRANSFORMER

The wide-band transformer at the output of each

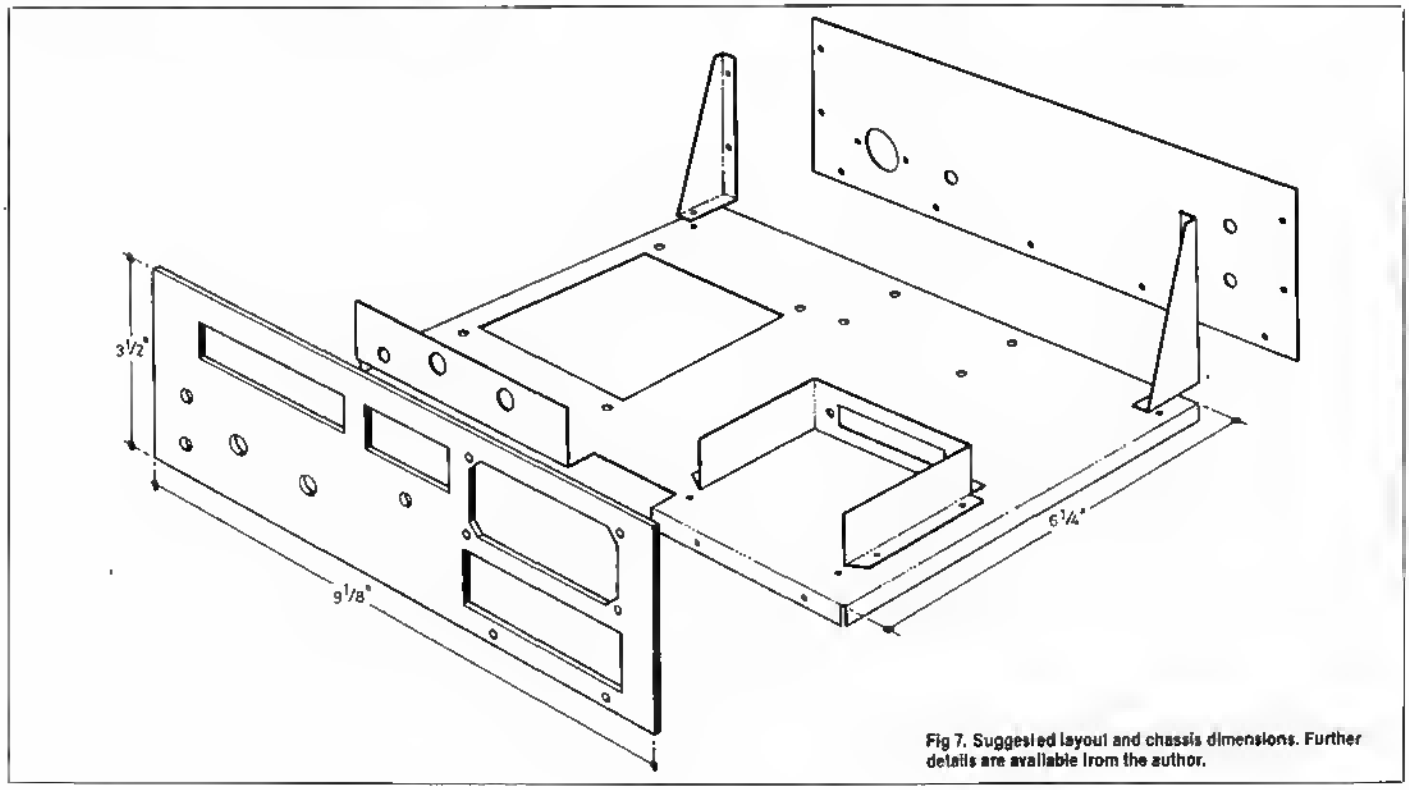


Fig 7. Suggested layout and chassis dimensions. Further details are available from the author.

converter is made from two FX1115 ferrite beads. The primary has ten turns of thin (32 to 36swg)wire, with two turns of the same or slightly thicker wire on the secondary. Take care not to strip the enamel when pulling the wire through the holes.

The BF981 RF amplifier for the 144MHz converter does not fit straight into the 'universal' converter board but can be fitted in one of two ways. It can be mounted beneath the board, keeping the source and drain connections as direct as possible and bending the two gate leads to meet the pads provided, or alternatively, a small edge-mounted daughter-board (see inset in **Fig 6**) can be used. The latter approach looks tidier, but may be less satisfactory from the RF point of view.

When wiring the main board, the two loudspeaker wires should be twisted together and brought to the phone jack separately from the others, being taped to the chassis base and then fed up to the speaker. All the remaining front panel wires, namely the volume control (top and slider) connections, plus the CW/SSB selector switch and RF gain control wiring, should be formed into a cable loom and tied neatly along the left hand side of the board. At this stage the pin numbering system used on the DIN41617 connectors should be noted - all the odd numbers run in one row and the all even numbers in the other. It is also worth noting that R26 actually consists of two 470Ω resistors in series.

The one difficult component to find is the triple-gang tuning capacitor, which should be of a size suitable for mounting close to the PC board. A 3 × 35pF component might be hard to find so positions have been provided on the main circuit board (shown dotted in Fig 2) where fixed series capacitors may be fitted to reduce the effective maximum capacitance using the capacitors-in-series rule. This enables tuning capacitors of higher values than 35pF to be pressed into service, though the use of excessively high values will result in severe compression of the tuning scale at the HF end. The prototype used a broadcast type 3 × 360pF tuning capacitor with a 47pF series capacitor on each gang. A number of surplus three-gang 75pF variables were located at rallies, and these required the series capacitor be 56p. More common are single- or twin-gang variables of 47pF and 75pF, which often have spindles at both ends so that a three-gang can be assembled with the aid of shaft couplers. Note that the series capacitor for the VFO is not mounted on the board, but can take the place of the wire link between the board and the variable capacitor.

The White Rose constructors used twin speed slow motion drives (6/36:1) for ease of tuning, but if better drives can be obtained, they are well worth the expense. Tuning scales are plastic or card discs of 2.5in diameter.

ALIGNMENT AND PERFORMANCE

After marking out the dial, the rest of the alignment will only take a few minutes. Connect a frequency counter to the buffer output, close the tuning capacitor and adjust L8 for 6.000MHz. Then open the capacitor fully and with any luck, the frequency will now be just a few kHz above 6.500MHz. If not, you may have to experiment with different values of series capacitors in order to get the correct tuning range. Initially, mark out the dial with a pencil at 100kHz intervals, then fill in the 10kHz intervals where possible. A permanently marked dial can now be made using black ink and rub-down lettering such as Letraset.

Without fitting a converter board, set the dial to 6.250MHz and inject a 6.250MHz signal from a signal generator into pin 2 of the multi-pole connector. Having tuned in the signal, reduce the generator output and tune L6 and L7 for maximum. Next, connect a sensitive RF voltmeter or an HF oscilloscope probe to pin 12 of IC1 and trim RV2 for minimum RF indication, this should be in the form of a sharp null. This completes the main board alignment.

If you don't have access to a frequency counter and the other test gear required, you can align the main board using a general coverage receiver which can tune 6.0 - 6.5MHz, or even a White Rose receiver which has already been aligned! Since this is a direct-conversion receiver, you can hear the VFO by connecting a receiver to the RF input at pin 2 of the multi-pole connector. You then simply adjust the coil slug to cover 6.0 - 6.5MHz, as indicated by the existing receiver calibration, and then tune up the band in 10kHz steps, zero-beating the signal and calibrating the new dial accordingly. L6 and L7 can be tuned at 6.25MHz by listening for the loudest VFO leakage out of pin 2 and RV2 can be adjusted by setting the control for minimum VFO leakage out of pin 2, and then for minimum direct rectification of extremely strong on-air signals.

Plug one of your lower frequency converters into the receiver. Connect an aerial, and see if you can detect off-air signals or a signal generator output as you tune across the band. If you can't, then the crystal oscillator probably hasn't started, so try adjusting L6 until signals appear. The converters for 3.5 to 21MHz use fundamental crystals which should start straight away, whereas the converters for 28, 50, 70 and 144MHz use overtone oscillators which will not operate until correctly tuned. In case of trouble, try monitoring the oscillator signal with a frequency counter on gate 2 of the mixer, or use a sensitive absorption wavemeter coupled to L6. The chosen circuit has been found to be most reliable and the oscillator should burst into life quite abruptly as its slug is adjusted. Inject a signal into the aerial socket, near the centre of the band in question, tune it in and peak L1, L2 and L3 for maximum signal, reducing the input level if necessary. Finally, re-peak L6 for maximum signal consistent with reliable starting of the crystal oscillator.

With the appropriate converter and just a few feet of wire connected, you should be able to copy stations on many bands. With a full sized tuned aerial, be prepared to turn the RF gain well down as signals low as 0.06μV are clearly audible.

My thanks to the members of the White Rose ARS who put their faith and money into this project. I would like specially to mention Dave, G4EZX, who hunted the land for components. Thanks are also due to Malcolm, G4DMH, who suggested the AGC method, and to Chris, G8UHW; who suggested the overtone circuit donkey's years ago, and I've been using it ever since. □

Printed boards and detailed mechanical drawings are available directly from the author (not from RSGB HQ). Main boards £3.00, converter boards £1.80 each. Please send a large SAE with all enquiries, and mark cheques payable to John R Hey at — 8 Armley Grange Cres, Leeds LS12 3QL. Please note that PCB layouts only are available from HQ — please enclose an SAE.

COMPONENT LIST

RESISTORS	
R1,2,7',8,14,15,31,32	15k
R3,	See Fig. 4
R16	270
R5,45,46,47	100k
R6,49,11	560
R9	1k5
R10,19,20,29,30,34	2k2
R17,28,48	1k
R18,27	470
R21,22	10k
R23	22k
R24,25	3k9
R26	1k (2x470)
R33	2k7
R35,36,37,44	5k6
R38,39,40,41,42	12k
R43	47k
R50,R51	1M
	39k
RV1	20k lin
RV2	50k 10 turn
RV3	10k log
RV4	2k2 skel
J2	27
CAPACITORS	
C1,2,6,7,12,13,14,15,16,20,21 C3,4,5,8,9,10,18,19 28,29,30,33,34,38,41	See Figs. 4, 5 and 6 10n hi K Disc
C11,14,17,27,40	1n med K ceramic
C26,31,35	120p Lo K ceramic
C32	470p med K ceramic
C36,37,39	1n COG or X7R
C42,52,53,56,60	0.1μ polyester
C43,44	22n 10% polyester
C45	1n5 5% polypropylene
C46	330p 5% polypropylene
C47,49,50	10n 10% polyester
C48	2n7 ceramic
C51	0.47μ polyester
C54,58	2μ2 16V elect
C57	47μ 16V elect
C59	470μ 16V elect
C55	4n 7 polyester 10%
C61	47μ 10V tant
SEMICONDUCTORS	
IC1	MC1496N
IC2	LM348N
IC3	SL6270C
IC4	LM380N
IC5	LM741CN
IC6	LM78L12ACZ
D1	BZX79C6V2
D2	1N4148
TR1,2,7,8	2N3819
TR3	BF981
TR4,5	BF494
TR9,10	BC548

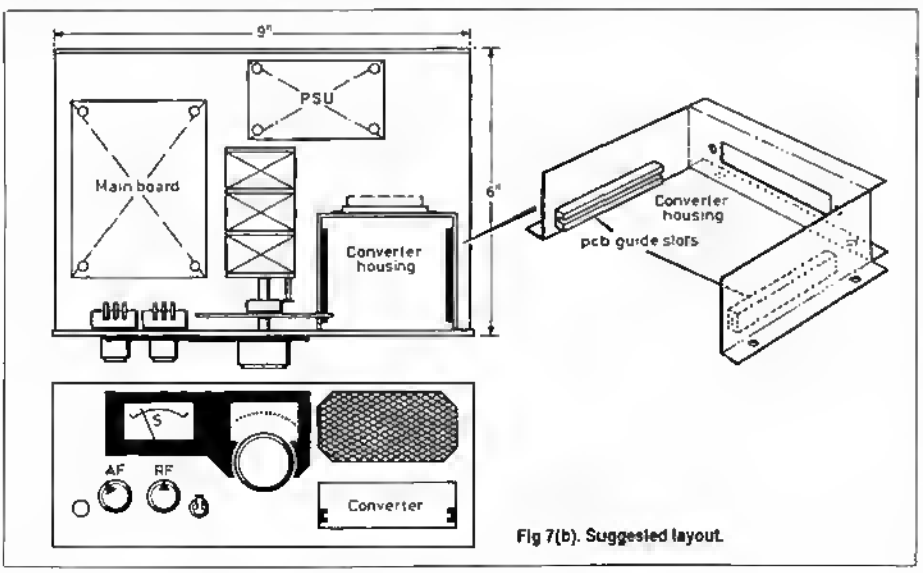


Fig 7(b). Suggested layout.

Dual-band verticals for 18-24MHz

As we move towards sunspot maximum, we are ideally placed to take full advantage of the new bands. John Bazley, G3HCT, describes a variety of suitable verticals to help you get going.

With the release of full facilities for these two new bands, and the sunspot cycle climbing towards its peak, why not take advantage of the excellent conditions? You only need to look at the HF predictions in *RadCom* to see the possibilities - 18MHz in particular offers the chance to easily work all continents within 24 hours.

These notes give simple constructional details for two different types of dual-band vertical antennas. I hope they will encourage you to build one of them, and join in the increasing activity on 18MHz and 24MHz.

RADIALS

As with any ground-mounted quarter-wave vertical, these two designs require close attention to the ground system - the better it is, the better the results will be. When testing these antennas I used a ground system of twenty radials, varying in length from 15 to 50', buried six inches below the surface. These were supplemented by four quarter-wave radials for 18MHz and two for 24MHz, all laid along the grass. The extra radials made a big difference to the match to 50Ω on 18MHz, which suggests that the buried ones were not sufficient on their own to create a low ground impedance. Other possibilities are to use lengths of chicken netting laid along the ground, elevated radials or some form of tuned counterpoise.

One way to check the adequacy of a conventional ground-based radial system is to keep adding radials until they no longer affect the VSWR. Reduction of ground losses will also reduce the bandwidth and make the tuning sharper, so it is quite possible that adding more details to an inadequate system will make the VSWR worse rather than better; if so, keep the new radials and re-adjust the matching. The objective is to make the ground system good enough so that extra radials have no effect at all on the VSWR.

OPEN SLEEVE ANTENNA

The idea for the antenna shown in **Fig 1** has been around for many years. It has appeared occasionally in American publications, and has been used in commercial multi-band HF beams, but it has not been used frequently by home-brewers in the UK. The idea is very straightforward. On 18MHz the antenna is simply a base-fed quarter-wave, with the two shorter elements having no real effect on its performance. With no ground losses the feed impedance will be about 35Ω; in fact the VSWR on my prototype was 1.55 at 18.1MHz, which is much as expected. On 24MHz the two shorter elements are each a quarter-wavelength long, and in spite of being connected directly to ground they are parasitically excited by the longer element. The theoretical feed impedance should be a little higher than 50Ω, but the VSWR on the prototype was very satisfactory, being 1.15 at 24.93MHz.

Fig 1 and **Fig 2** show the construction of the antenna. The 18MHz element provides the main structural strength, and although the diagram shows a 1" diameter fibre-glass insulator between the ground post and the main element, other forms of construction are of course possible. The 24MHz elements are mounted on either side, with their lower ends connected by a metal strap which also connects to the ground post and all the radials. A Perspex or similar insulator supports the 24MHz elements part-way up. The dimensions shown should provide a low VSWR at both 18.1MHz and 24.9MHz.

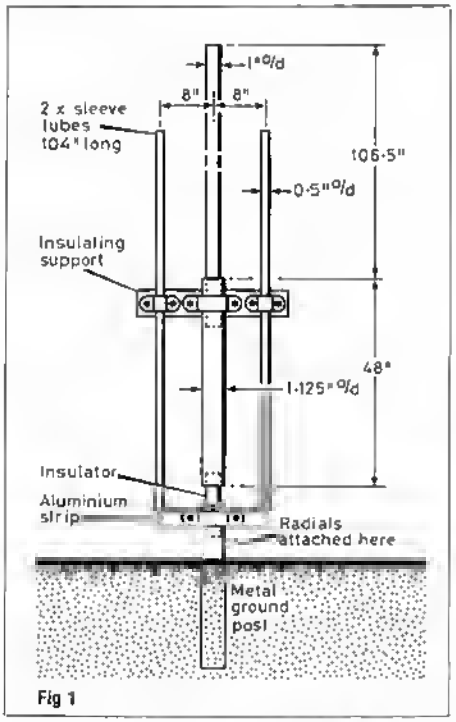


Fig 1

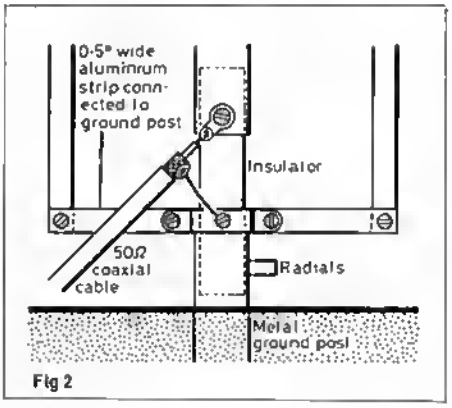


Fig 2

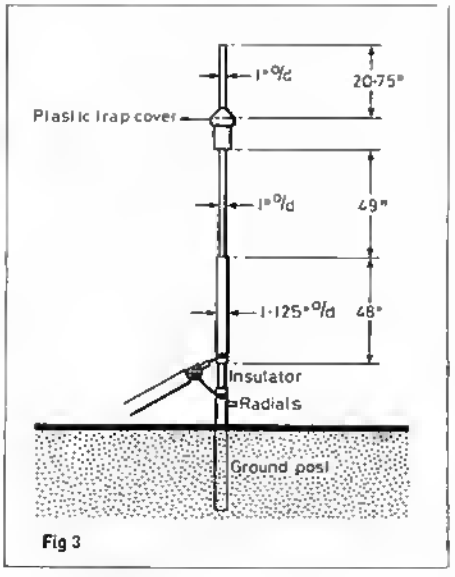


Fig 3

Fig 1. Open-sleeve quarter-wave vertical for 18MHz and 24 MHz.
Fig 2. Detail of the feed system for the open-sleeve vertical.
Fig 3. Trapped vertical for 18MHz and 24MHz.

TRAPPED ANTENNA

If you have the good fortune to find a defunct 14/21/28MHz trapped beam or vertical at a 'flea market' stall, you can easily modify one of the traps to make an 18/24MHz quarter-wave vertical antenna (**Fig 3**). The traps will originally be tuned to 21MHz or 28MHz, and I have successfully modified both types to 24.9MHz. The following instructions apply particularly to Hy-Gain traps, and other types can be modified in a similar way.

Begin by gently tapping the weather-proof cap off the metal sleeve 'A' using a light hammer and a piece of wood (**Fig 4**). Next, remove the screws 'B' securing the outer metal sleeve, and slide off sleeve 'A' by rapping the end 'D' of the whole trap sharply against a block of wood (**Fig 5**), thus revealing the coil inside.

To raise a 21MHz trap to 24.9MHz, you will need to remove some turns from the end nearest 'C' (for the Hy-Gain trap, leave 21 turns). To lower a 28MHz trap to 24.9MHz, strip off the original winding and, for the Hy-Gain pattern, rewind with 21 turns of 14swg.

The trap then needs to be resonated to 24.9MHz using a dip oscillator (GDO), bearing in mind that the outer metal sleeve provides the necessary capacitance. The trap is reassembled without screws or end cap, and is capacitively coupled to the GDO coil by connecting a short length of insulated wire to end 'C' and looping it once around the coil. This provides a clear and accurate indication of resonance, provided that the trap is not being detuned by any nearby metal object.

With about the right number of turns on the coil, the capacitance across the trap is adjusted by

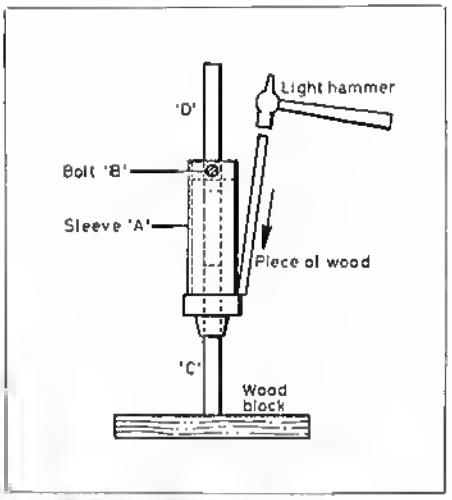


Fig 4. Dismantling a commercial trap. First remove the plastic end cap by tapping gently as shown.

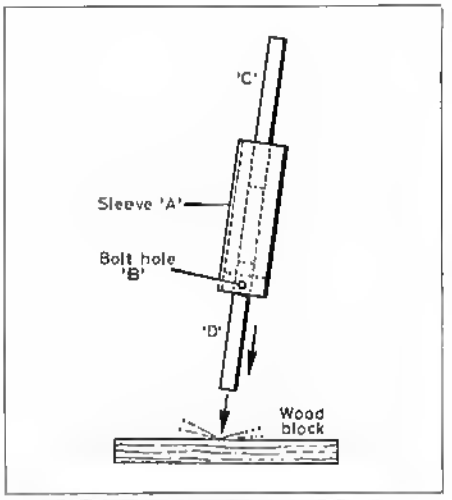


Fig 5. Remove sleeve 'A' by rapping the whole trap against a wooden block.

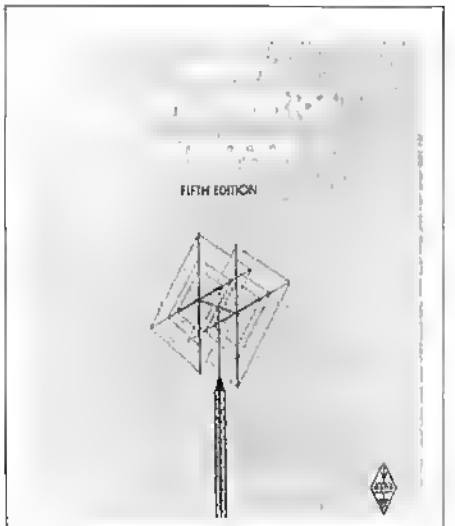
sliding the metal sleeve 'A' back and forth. For the Hy-gain traps, after modification of the windings as described above, it was necessary to slide the sleeve 0.5" further over the coil. Finally, drill new holes for the fixing screws 'B' and reassemble the trap with its weather-proof cap. It is wise to check that the cap really is weather-proof at this point.

Construction of the rest of the antenna is quite conventional (Fig 3), though the details will depend on the type of trap used. With the end section in place beyond the trap, adjust the length of the lower section for minimum VSWR on 24.9MHz, then adjust the length of the end section for minimum VSWR on 18.1MHz. The earlier remarks about radials apply here too, and by coincidence I obtained the same VSWRs with the trapped vertical as with the sleeve type.

PERFORMANCE

When provided with a good radial system, there is very little to choose between the two antennas, and they can both be modified for other pairs of bands. If you happen to have a spare trap, try modifying it and build the trap vertical. If not, the sleeve quarter-wave is easy to build for any two bands which lie within a 2:1 frequency range.

Finally, it is worth noting that, like most verticals, these antennas offer the advantage of being fairly inconspicuous — a bonus for those living in 'visually sensitive' areas! □



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continued on next column

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RADCOM PCB SERVICE

G4PMK SIMPLE SPECTRUM ANALYSER
November 1989

BOARD DESCRIPTON	CODE	PRICE
RF Board	118946	£5.30
Video/sweep board	118947a	£4.25
Marker generator/PSU	118947b	£3.90
Complete set of 3 boards	1189SSA	£12.50

G3TXQ TRANSCEIVER
Febuary/March 1989

BOARD DESCRIPTION	CODE	PRICE
Main IF/Audio	028945	£10.00
VFO	028946	£4.75
Driver/Preamp	028947	£5.50
Low pass filter	028948a	£6.50
Band-pass filter	028948b	£4.00
Control board	038942a	£4.50
Regulator board	038942b	£2.00
Complete set of 7 boards	0289TXQ	£23.50

All prices include postage and packing.
Please note these PCBs are not available from RSGB HQ, but direct from Badger Boards, 87 Blackberry Lane, Four Oaks, Sutton Coalfield B74 4JF. Tel: 021-353 9326

ICOM IC-726 REVIEW

Peter Hart, G3SJX

In the September 1989 issue of *RadCom*, I reviewed the Icom IC-725 HF transceiver. Since that date, Icom have launched the IC-726 which is basically the same radio but also includes coverage of the 50MHz band. All my comments in the September review relating to the IC-725 also apply to the IC-726 and hence this review concentrates primarily on the 50MHz aspects. Read the September review for full details.

FEATURES

In addition to tuning 30kHz to 33MHz, the receiver also covers from 46.2 to 61.1MHz although the manual quotes somewhat narrower tuning ranges. Two SO239 antenna sockets are provided, one for HF and the other for VHF operation. This is a major advantage over the Kenwood TS-680 which only has a single antenna connector. In addition to the HF allocations, the transmitter covers 50-54MHz with nominal 10W output. The HF power of 100W is retained. SSB, CW, FM and AM modes are fitted as standard; FM was an option for the IC-725.

To summarise the principal features of this radio, common with the IC-725, tuning is in 10, 20 or 50Hz steps with 1kHz and 1MHz steps for rapid QSY. Amateur bands may be stepped with the last used frequency and mode in each band stored. Twin VFOs are provided with 26 easy to use memories and scanning. The receiver includes a noise blanker, switchable preamp/attenuator and RIT. Although the transmitter does not include speech processor or VOX, fast break-in on CW, variable power and a very quiet fan are provided. The backlit LCD display gives frequency readout to 10Hz resolution. The rear panel connectors allow comprehensive interfacing to linear, auto ATU, data terminals, computer control etc. The radio requires a 12V PSU such as the PS-55 and internal options include narrow CW filter and high stability reference oscillator. The 36 page instruction manual is excellent.

The IC-726 is identical in styling and size to the IC-725 at 24.1(W) × 9.4(H) × 23.9cm(D). The transmitter and receiver are double superhet with IFs of 70.45 and 9.01MHz with a third IF at 455kHz on FM. The front end mixers and amplifiers are also used on 50MHz with extra switched filters and an additional preamplifier in the receiver input. The transmitter uses a separate 50MHz PA. The local oscillator drive on 50MHz is obtained by up-converting the HF LO drive from the frequency synthesiser by mixing with a 46.08MHz crystal derived source.

MEASUREMENTS

A brief check of the HF performance showed this to be virtually identical to the IC-725 previously measured, with the 50MHz performance figures shown in the accompanying table. The receive sensitivity figures are given for the preamp switched in circuit which, incidently, is the second of the two preamps used on 50MHz. When switched out, the sensitivity was about 3dB less but the dynamic range was a little better. The input attenuator reduced the front-end gain by 18dB. The sensitivity reduced outside of the amateur band and was down about 15dB at 61MHz. The S-meter is some 12dB more sensitive than on HF, attributable to the extra front-end gain.

The transmitter noise sidebands on 28MHz were identical to the IC-725 previously measured and shown in fig 2 of the September review. On 50MHz, the close-in sideband performance was some 10-15dB better as shown in **fig 1** of this review. Further investigation revealed that the noise sidebands varied from band to band, generally becoming less on the lower frequencies.

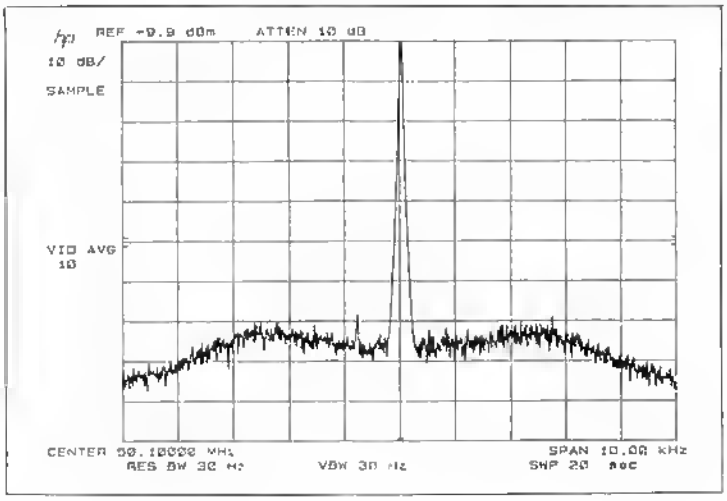

Fig 1. Transmitter noise sidebands on 50MHz.

ICOM IC-726 MEASURED PERFDRMANCE

For full performance on HF see Icom IC-725 review, *RadCom* Sept 1989

MEASUREMENTS ON 50MHz

RX sensitivity SSB for 10dB s+n/n: 0.08 V (-129dBm)
RX sensitivity FM for 12dB SINAD 3kHz pk dev: 0.13 V (-125dBm)
RX sensitivity AM for 30% mod depth: 0.56 V (-112dBm)

S-Reading	Input level SSB
S1	0.7 V
S3	1 V
S5	1.6 V
S7	3.1 V
S9	7 V
S9+20	60 V
S9+40	320 V
S9+60	3.2mV

3rd order intercept:	-7.5dBm preamp in
3rd order intercept:	-3dBm preamp out
2 tone dynamic range:	88dB preamp in
2 tone dynamic range:	89 dB preamp out
Blocking level:	-5dBm preamp in
Blocking level:	0dBm preamp out
70.45 MHz IF rejection:	61dB
Image rejection:	95dB

TX power output CW/FM:	11W
TX power output SSB:	11W PEP
TX Harmonic output:	<-75dB
TX Spurious outputs:	<-65dB
TX 2 tone intermod. products:	-34dB

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with the receiver preamp switched in. All two-tone transmitter intermodulation products quoted WRT either originating tone.

ON-THE-AIR PERFORMANCE

I really like this little rig. It is very easy to use and gives a good all-round performance. All the comments I made regarding the IC-725 apply equally to the IC-726 with the added bonus of covering 50MHz as well. It is very agile to change frequency and monitor channels aided by the band store and ease of selecting memories. The synthesiser is completely free of clicks.

The receiver performed well on all modes and the audio quality was reasonable. The transmit quality was reported to be good with a clean and narrow transmission. As with the IC-725, some sideband noise was audible to local stations when operating CW.

CONCLUSIONS

The IC-726 is an excellent all-round performer for HF-50MHz. It is suitable for use at home, yet small enough to use in the car and take portable. The ergonomics are excellent, the output power on HF holds up well into a mismatch which is good for mobile operation and the transmit/receive switching is fast for data modes including AMTOR. The only deficiency is the poor synthesiser noise which limits the performance under extreme conditions when copying weak signals amongst much stronger signals. The list price, current as of December 1989, is £989. A 12V PSU is required for mains operation such as the PS-55 at £192. I have decided to purchase this IC-726 to complement my Ten Tec Corsair, as a second HF rig and to provide 50MHz operation and other features which the Ten Tec does not have. What more can I say? □

ACKNOWLEDGEMENTS

I would like to thank Icom (UK) Ltd of Herne Bay for providing the equipment.

IN PRACTICE

Beam or linear - and a problem with cans

"I have two questions for you. First, if the manufacturer of an HF transceiver specifies the use of 4Ω headphones and mine are 16Ω, will either the rig or the headphones be damaged? Second, if you have the choice of either a 7dB gain beam antenna with rotator or a second-hand 1kW linear amplifier, which one is preferable? My transceiver has 100W output"
J Y, Barbados, West Indies.

The answer to the first question is simple – no, neither the rig nor the headphones will be damaged. If the maker of a particular rig specifies that the headphone output has an impedance of 4Ω, it's safe to assume that any headphones whose impedance is more than 4Ω can be used with no problems. In other words, regard the rig's quoted audio output impedance figure as the minimum which anything you wish to plug into it must have. The same is true for an external loudspeaker socket, if one is fitted, and indeed the headphone socket is usually wired in parallel with the speaker with a 'break' contact on the socket to mute the speaker when headphones are plugged in. In some equipments a low-value resistor is connected in series with the headphone output, presumably to ensure that no harm is done to the audio output stage as a result of inadvertant short-circuits.

On the second point, we'd take the beam every time - especially if we had an exotic callsign like 8P6! First of all, the beam antenna will give 7dB gain on receive as well as transmit. Even on the HF bands, this could make the difference between hearing and working someone quite easily and never knowing that they were there. For weak-signal work at VHF and UHF, of course, 7dB of gain on 'receive' with no increase in noise figure would be regarded by dedicated DX-chasers as a gift from the gods.

On the assumption that J Y is referring to an HF antenna, the important point is not so much the gain – although that is well worth having – but the fact that the beam antenna will have considerable directivity and will therefore bring about a very large reduction in QRM. This works in two ways. First, there'll be less interference from signals which are co-channel with the ones JY wants to hear and is beaming at but which are somewhere off the side or back of the beam. Second, he'll also be tiring less RF energy off to places where it doesn't need to be going at a particular time and therefore he'll cause less QRM to someone half the world away who's trying to work a little DX of his own. In general terms, whether or not you hear a particular station on HF (assuming that the propagation's there in the first place) is more likely to be determined by whether there's interference from other stations than by anything else. It follows that directional HF antennas are decidedly sociable, as well as making your own job easier by bringing about a considerable reduction in the strength of signals you don't want to hear. And if you have an 8P6 or similar callsign that's likely to attract the attention of an awful lot of people as soon as it hits the aether, there's even more of a case for having a beam antenna. Running 1kW into an omnidirectional antenna from Barbados on an HF band that's well open strikes me as one of the quicker ways to set up something which makes the average pile-up sound like a polite discourse between two philosophy dons. Equally, it would certainly be a good way of ensuring a supply of non-stop contacts with USA stations, either on the east or west coast depending on how propagation is working; this may or may not be what J Y wants.

The only counter-argument is the fact that the amplifier would give J Y's station 3dB more ERP than the antenna will, but in practice it's more or less certain that any slight benefit thus gained would be more than outweighed by the lack of directivity during reception. After all, 3dB is only about half an S point and I can't remember the last time I had a contact on the HF bands where a reduction of 3dB in the DX's signal strength would have meant no QSO. However, rejection of signals off the sides and back of an HF beam might make a great deal of difference to whether the station you want to have a contact with is copiable or not. The reason is that a beam antenna with 7dB gain is likely to have 20-25dB rejection in some directions, which means that the QRM could be reduced by four or five S-points. It's a totally different matter on VHF and UHF, of course, where QRM from stations on the same frequency normally isn't the limiting factor unless there's a very widespread tropo opening or a major contest. On these bands, the *real* DX is usually perilously close to the noise floor of the receiver and every extra dB of gain in the system helps push out your range a little further.

This 'interference-limited' property of the HF bands – which is even more true for short-wave broadcast reception than it is for amateur work - is highly important in practice, and there's an argument for suggesting that the directive properties of an HF antenna are rather more important than their gain figures. Actually, there seems to be a better case for running high transmitter power on the VHF and UHF bands than at HF – but that's getting off the point so we won't pursue it here, and anyway we don't want the Potters Bar postman keeling over under the weight of threatening letters from the ORO HF DX brigade!

All in all – and whether it's HF or 10GHz – if it comes to a toss-up between an antenna with more gain (and by implication better directivity) and more transmitter power, we'd go for the antenna every time. For VHF and UHF enthusiasts who think in terms of path-loss capability, that of your station will be much more a function of your antenna gain and feeder loss than your transmitter power.

What sort of capacitor?

"I frequently have to carry out repairs on my equipment (which incidentally is all-valve) which may involve replacing a capacitor. The circuit diagram informs me that, for example, a 0.005μF ceramic disk is required. Other times it may be tantalum or silver-mica. My question is why? What determines the type of capacitor which should be used? I find this quite confusing"
V W, Wakefield.

For some reason we had no less than four letters asking for information about different types of capacitors this month, so here's a sort of portmanteau answer in which we've tried to deal with all the points which were raised. Unfortunately it's a rather big subject and we've only the space for a quick look at it here - if you'd like to read a full-length article about capacitors and their internal workings, let us know and we'll prepare one.

In general terms, you can think of any capacitor as a frequency-dependent resistor which won't allow DC to pass but which will let AC through. In theory (but certainly not in practice) the higher the frequency, the less impedance the capacitor will present to it. The simplest kind of capacitor would consist of two pieces of wire placed a short distance apart and separated only by the air between them; in fact the neutralizing capacitors in a VHF linear amplifier consist more or less of just that. The air in this case forms what is known as the *dielectric* of the capacitor, i.e. the material which separates the two elements of it. If you need more capacitance, you bring the wires closer together; if you need still more you change the wires to plates, which is virtually how you make an air-spaced variable capacitor.

Unfortunately you can't obtain very high values of capacitance by using air as a dielectric. The largest air-spaced variable in any catalogues on our shelf is a 750pF device, whereas for some applications such as power-supply reservoir capacitors you need ten million times more capacitance than that. I suppose you could make a 7,500μF air-spaced capacitor but according to my calculator you'd need about a square mile of space for it...

In some ways, as we'll see, air is a very good material for a capacitor dielectric but in one specific way it's the worst. The 'permittivity' of a dielectric material is the ratio of the capacitance of a capacitor using that material as a dielectric to the capacitance of the same capacitor using a vacuum as a dielectric. The permittivity of dry air is approximately equal to one – that's to say it's almost the same as a vacuum. Every other dielectric material has a higher permittivity than air, which implies that a capacitor using an air dielectric will be larger than a capacitor using

CAPACITORS

Type	Capacitance range	Maximum voltage	Accuracy	Temperature stability	Leakage	Comments
Mica	1pF-0.01μF	100-600	Good		Good	Excellent; good at RF.
Tubular ceramic	0.5pF-100pF	100-600		Selectable		Very low values available; several tempcos available (including zero tempco).
Ceramic	10pF-1μF	50-1000		Poor		Small, inexpensive, very popular; can be self-resonant – 100kHz.
Mylar	0.001μF-10μF	50-600	Good	Poor	Good	Inexpensive, good, very popular.
Polystyrene	10pF-0.01μF	100-600	Good		Excellent	High quality, large; good for signal filters
Polycarbonate	100pF-10μF	50-400	Good	Good	Good	High quality; good for integrators
Glass	10pF-1000pF	100-600	Good		Excellent	Long-term stability
Porcelain	100pF-0.1μF	50-400	Good	Good	Good	Good, inexpensive; long-term stability
Tantalum	0.1μF-500μF	6-100	Poor	Poor		High capacitance, with acceptable leakage; polarized, small; low inductance; very popular
Electrolytic	0.1μF-0.2F	3-600	Terrible	Ghastly	Awful	Not recommended except in power supply filters (use tantalum for high-capacitance requirements); polarized; short life
Oil	0.1μF-20μF	200V-10kV			Good	High-voltage filters; large, long life.

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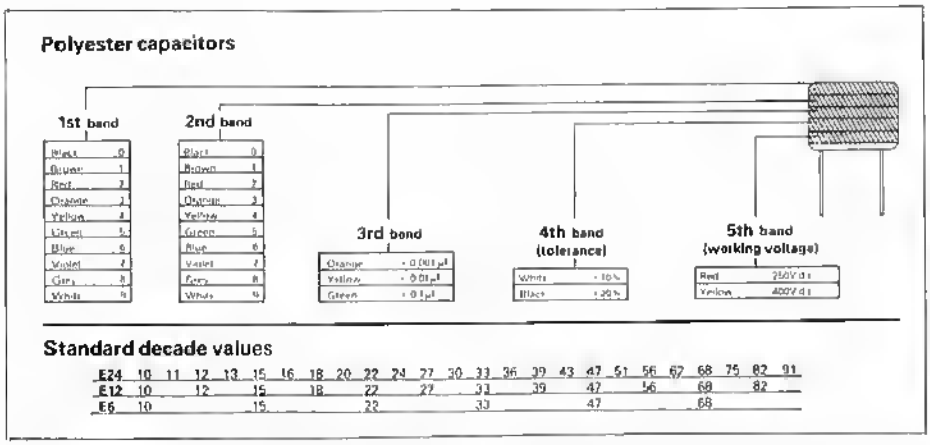


anything else. It's this fact (together with another which we'll come to shortly) which makes large capacitor values possible in practical components; for instance a 100,000μF component for use in a power supply can be about 6" long and 3" in diameter.

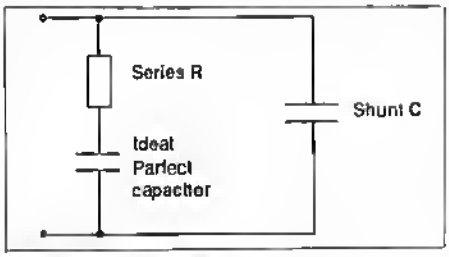
When we talk about 'ceramic' or 'tantalum' or 'silver-mica' capacitors, we're really referring to the dielectrics which they use. Permittivity is given the symbol ε (the Greek letter epsilon) and in some ceramics ε is more than 1000, so ceramic capacitors can pack quite a lot of capacitance into a small size. In the case of a tantalum capacitor - or any other electrolytic for that matter - we should also bear in mind that it's not so much the ε of the dielectric which allows these component to have very high capacitance for their size as the fact that their construction permits the spacing between the plates of the capacitor to be very small indeed, typically a few molecules. The situation is similar for dielectrics such as mica. The permittivity of this substance is only about 6 but it also has high 'dielectric strength' - which basically means that you can apply a high voltage across a very thin layer of it without it breaking down. So if you coat both sides of an exceedingly thin mica sheet with silver and attach leads to each side, you have a capacitor with a combination of quite high capacitance and high working voltage for its size; it's known as a 'silver-mica' capacitor. It's important to bear in mind that different dielectrics vary markedly in their dielectric strength; this is why a silver-mica capacitor of 350V DC working is likely to be similar in size to a 63V DC working polycarbonate, although both have similar permittivities.

The two main reasons for the very wide variety of dielectrics used in capacitors - off-hand I can think of about 20 and no doubt there are others - are a) that a very wide capacitance range is needed in electronic circuitry and b) that all dielectrics have some more or less undesirable properties which makes certain types of capacitor unusable in certain situations. Taking the first point first, the lowest value of capacitor you can go to a shop and buy is probably 2.2pF, whereas the highest nowadays is more like 2.2F. That's a difference of 10^{12} or if you prefer, 1 followed by twelve noughts; it's about a million times higher than the range of resistors we usually use, to put it in perspective. No one dielectric would cope with that sort of range and allow manageably-sized components.

On the second point, all sorts of losses occur in dielectrics and some of them vary very much with frequency. At very low frequencies various forms of leakage in the dielectric have time to manifest themselves, such as DC leakage currents and sundry other long-time-constant effects. At very high frequencies some of the processes which make certain types of dielectric work at all don't have time to become effective and therefore cause losses. In a nutshell, this is why all capacitors can be represented as a perfect capacitor in series with a series resistor and with a shunt resistor across the entire assembly.

Below, we've drawn up a little chart of the approximate usable frequency ranges for capacitors with different dielectrics, which might go some way towards showing just how widely dielectric properties vary.

Another thing to think about is leakage current, which we mentioned briefly above. In theory, a capacitor blocks DC; in practice all capacitors allow a small current to pass when a DC voltage is applied across them, and the magnitude of this 'leakage current' varies enormously depending on what dielectric is used. A vacuum is the best in this respect, closely followed by Teflon, glass, polystyrene and other plastics such as polypropylene. Far and away the worst are electrolytics, whose leakage characteristics are absolutely dreadful! If we charge a given capacitor to a particular level, the time it takes for the charge to leak away to 36.8% of its initial value is given by RC where R is the leakage resistance and C is the capacitance. For a polystyrene capacitor, to reach this level will take several days; for a typical electrolytic you'll be lucky to measure any more than thirty seconds or so. High-permittivity ceramics aren't brilliant either and they'll only give you a few minutes,



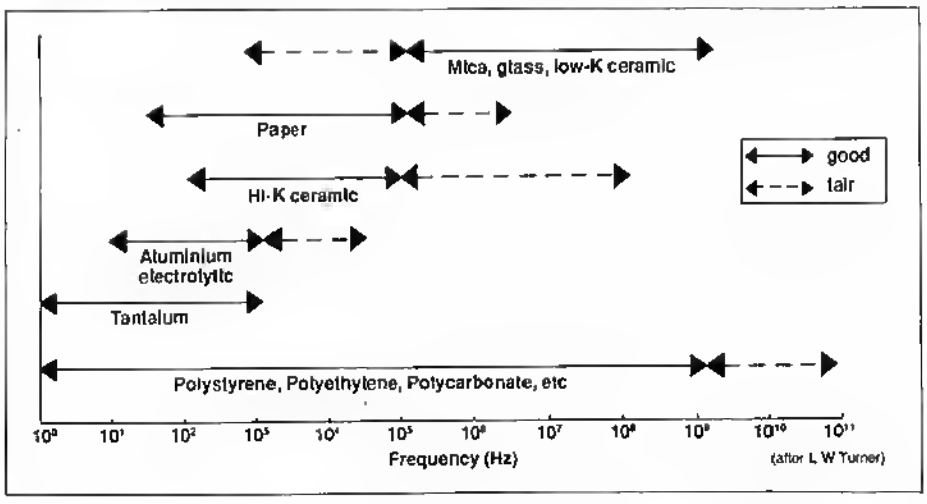
Above: losses in a capacitor.
Below: frequency coverage of different types of capacitor.

whereas the average tantalum might manage an hour or two. Of course, the fact that electrolytics have high leakage current (and also poor accuracy - most of them have a tolerance of something like -20% and +50% of their marked values) doesn't much matter for the sort of uses they're put to.

This brings us to another point, which is the stability and accuracy of the marked value. As we've seen, electrolytics don't do very well with the latter but it doesn't matter because what you want an electrolytic to have above all else is high capacitance in a usable size. A power-supply reservoir capacitor also needs to be able to handle ripple current, which can be several amps. In the face of those requirements, poor absolute accuracy of capacitance value and high leakage current whose magnitude varies dramatically with temperature, applied voltage and a few other things aren't relevant. Neither are a 10% increase in capacitance when the temperature is raised from 20 to 70°C and approximately a 10% reduction in capacitance when you raise the frequency from 50Hz to 10kHz. But if you want to make a stable LC oscillator, for example, you don't want a capacitor which is going to change its value by a large amount when the circuitry warms up or which has high leakage current. You'd also like the component to have a capacitance which is quite close to the value marked on it so that the circuit will work at the intended frequency. In this application you'd probably use polystyrene or silver-mica components, the latter if you needed high working voltages as well.

Most silver-micas have a stability of about 1% and a very low temperature coefficient; precision polystyrene capacitors can have even better tempcos, going as low as 20 parts per million. By comparison, ceramic capacitors are pretty poor in several respects. Ceramics fall into three main groups, distinguished by the permittivity of their dielectric material. So-called 'Low-K' components have low leakage, close tolerances and high stability, and you can get them with different temperature coefficients; you can generally obtain these in values up to about 330pF. The 'Medium-K' devices generally run to about 5000pF but these display a non-linear negative temperature coefficient and don't have especially low losses. The 'High-K' ceramics are good for decoupling applications but not much else; they provide high capacitance in a small size but at lowish working voltages, and their value changes markedly with time, temperature and applied voltage.

Your ordinary disc ceramic probably has a tolerance of -20% and +80% of its marked value as manufactured, and its value will wander all over the place in everyday use. However, ceramic capacitors usually have low series inductance, which makes them very good for decoupling purposes. Incidentally, large electrolytics have



frightfully high series inductance, which is why reservoir and smoothing capacitors in PSUs should always have ceramic capacitors connected across them to provide some decoupling at high frequencies. You can safely assume that the average electrolytic is going to start to look more like a low-Q inductor than a capacitor as the frequency winds up beyond about 20kHz or so, so don't assume that a supply line with a 10μF electrolytic to earth must be perfectly well decoupled from an RF point of view. In other words, you need to take the well-known formula $Xc = 1/2\pi fC$ with a pinch of salt when thinking about electrolytic capacitors at high frequencies. Just because the formula says that the reactance of 10μF at 1MHz is 0.016Ω doesn't mean that a real-life 10μF electrolytic will look like 0.016Ω at 1MHz; it most certainly will not. Tantalums are better in this area, but not that much better.

The bottom line of all this - and there's much more which could be said - is that the type of capacitor you use in a given circuit has to be chosen with an eye on what it's doing in that circuit. There may be a number of possible ways to achieve a given capacitance in a particular size, but the designer has to think of such things as the following:

1. The maximum DC and AC voltage which will appear across the capacitor.
2. How much AC current it will have to pass, and at what frequency.
3. How accurate the value needs to be and how much or little it can be allowed to change with time, temperature and working voltage.
4. How much leakage current can be allowed.
5. A few other things we haven't discussed here such as power factor, dielectric absorption and - for a production engineer, one of the most important points of all - price.

Finally, on page 45 we've reproduced a table from the excellent book *The Art of Electronics* by Horowitz and Hill which we mentioned in these pages a couple of months ago.

This illustrates the strengths and weaknesses of different dielectrics rather well. For the two readers who asked, we've reproduced opposite, a table of capacitor colour codes by kind permission of RS Components. We hope that's covered your questions but if there's anything else you'd like to know about capacitors, just ask.

Lots of bottle

Back in December we ran a piece on servicing valve receivers which went down well. However, Mr P C Cooper, RS45352, wrote in to make a point which we'd overlooked. He said "In the section dealing with checking voltages on valve pins, it is stated that the control grid ought to have a negative potential on it and that the cathode should be somewhere near earth. This is of course correct, but in the majority of mains receivers with indirectly-heated valves the statement could be a little misleading since the control grids of the AF stages were nearly always 'earthy' and the cathode a little positive because of the cathode bias resistor. In the RF and IF stages, the AVC circuits provided a negative voltage on the control grid by means of rectification of the signal voltage, but even here the cathodes were sometimes above earth — i.e. positive." Mr Cooper adds "To those who were not brought up on valve techniques, it could be a little disconcerting to find a cathode which is positive and the grid earthy, not realizing at first that the effect is the same. "Quite right, sir, and it's worth mentioning that the voltage-amplifier stages in valve AF amplifiers often incorporate a cathode bias resistor as well. The idea is that the grid should always be negative with respect to the cathode; the flow of anode current causes a small voltage drop in the cathode resistor, so the cathode is above earth by the amount of the voltage drop. The grid is usually taken to earth via a high-value resistor.

FM rig problems

"I have recently built a 144MHz FM rig from a mixture of designs. The Rx uses a 3SK88 RF amp and bipolar mixer to 10.7MHz. This drives an MC3357 IC (5μV for -3dB limiting) which carries out conversion to 455kHz. This is fed via a Murata CFM455F filter before limiting and detection within the IC. The receiver suffers from vehicle ignition interference via the aerial lead, which it picks up from most vehicles even if they are well suppressed. Obviously this is worst with weak signals, although otherwise its weak-signal performance is excellent. Can you explain the requirements of an FM IF strip to stop this? Is it merely a matter of adequate gain and limiting?" PM, Oakham.

We weren't sure whether this was a 'Helpline' or an 'In Practice' item, but on balance we thought we'd give it a spin in this column. The answer to the question posed in the last sentence, in a word, is yes. One of the most attractive features of an FM receiver is that it can be made to be insensitive to amplitude-modulated signals, and because interference such as that resulting from car ignition circuitry consists of superimposed noise peaks on an incoming signal - which is another way of saying that they modulate the amplitude of it - an FM receiver can reject such interference almost completely. To do this, there must be an item of circuitry called a *limiter* incorporated in it. The function of a limiter is to 'clip' the IF signal so that any amplitude variations are removed and the FM carrier level is forced to maintain a constant amplitude. This 'clipping' action of the limiter removes any noise pulses which may have been riding on the incoming signal, and in so doing it provides a very high degree of AM rejection before the signal is fed to the FM detector stage.

One of the implications of this is that the IF amplifier which precedes the limiter needs to have very high gain, in order to ensure that the limiter keeps operating as a limiter despite the very large changes in signal level which are inevitable - particularly in an amateur-type NBFM receiver. We don't have a data sheet for the 3357 handy (some kind person 'borrowed' ours) but the figure of 5μV for -3dB limiting seems to be a statement of what's usually known as the '-3dB limiting sensitivity' - that's to say, the signal level reduction at the input to the device which is necessary to cause the output at the detector to fall by 3dB. If it is, presumably the IC needs to see a good 20μV at its input for the limiter to be working properly, and we'd imagine that it would prefer a lot more.

The Murata filter is of course a 455kHz job, and we presume that there's nothing wrong with it. The insertion loss of the CFM455F should only be 6dB and its stopband rejection ought to be 45dB; its -6dB bandwidth should be 12kHz and the -50dB bandwidth 24kHz. We also assume that the mixer is working correctly. Otherwise, it's a trifle difficult to work out at this distance why P M's receiver is so sensitive to impulse interference. If there's enough gain in the 3357 and the limiter is working properly, it certainly shouldn't be.

I must admit that although I've messed about with all sorts of weird and wonderful ICs in my time, I've never played with the 3357. We'd be most grateful if anyone who can shed a bit more light on this problem would drop us a line.

Callsigns on the air

When do you give your callsign on the air? When do you give other people's callsigns? When *must* you do this? We've had a couple of letters on this topic in the last month or two, so here's what amounts to our answer - if you hear that the DTI has locked us up in the Tower of London pending beheading, you'll know that we got one or two teensy details slightly wrong...

To be a good operator, you always need to put yourself in the place of the people listening to you. There are often more of them than you think. Besides the person you're talking to, there may be other amateurs listening in, weighing up what kind of a person you are and deciding whether to give you a call afterwards. SWLs may also be listening to you and deciding whether radio amateurs are worth talking to at all - or whether it's worth becoming one. And you never know when the Radio Investigation Service have an ear on the amateur bands...

The thing that makes the biggest impression of all is how you go about the basic business of identifying yourself and passing the transmission back and forth. Let's deal with the licence requirement first, to keep on the right side of the RIS. You are required to give your callsign at the start and end of a contact, and at 15-minute intervals during long periods of transmission. 'Periods of transmission' don't have to be continuous; some people hold a daily ragchew for hours on end, continually passing the transmission back and forth but giving their callsigns only every fifteen minutes. Although this is legal, it isn't necessarily good operating because it keeps listeners waiting in order to discover who's who. One of those listeners might be the best DX you never worked, or an old mate you'd love to talk to but who got bored with wondering who was on frequency.

You *must* give the callsign of each station you're working when you first establish communications, and also when you end the contact. You're not required to give the other callsigns in between, though it helps listeners if you do. In a two-way QSO, it's normally good practice to start and finish each transmission with both callsigns, as in 'G7ZZZ from G9YYY'.

It's eminently reasonable to take advantage of the minimum identification requirements when you need to save time. On what's supposed to be a quick break, there's obviously no need to say 'G7ZZZ from G9YYY - Yes, G7ZZZ from G9YYY' when all that's required is simply 'Yes'. In the middle of a repeater QSO, you only need start and end with 'From G7ZZZ' but use your judgement; it things are a bit confused, it might actually be useful to give both callsigns. In a big net, it's a total waste of time to list 'G9SEK in Abingdon, G9FPK in Purley, G9ASR on the Welsh Border, Peter Gurney, Peter Davey, Dan'l Whiddon, Harry Hawk...' every time the transmission is passed along. Although the licence implies that you have to list Uncle Tom Cobley and All when you join and leave the net, the practical way to get around this is to address your remarks to relatively few named stations. Thus you can get clear without causing listeners to slip into a light snooze by announcing something like 'G7YYY, G7ZZZ and the net, this is G9YYY signing'.

When you do mention other callsigns, it helps everybody if you give your own callsign last of all. In the USA that's actually a legal requirement, and a good thing too. So how about more of 'G9YYY from G7ZZZ' and less of 'This is G7ZZZ passing the transmission back to G9YYY' (it makes me yawn even to type it). If you don't develop a consistent habit for giving callsigns, you'll frequently get into a muddle. You might even become one of those people who say silly things like 'this station G9YYY' - presumably to remind themselves who they are. Bet you say 'the personal here is...' as well, which ought to have stayed on 27MHz where it belongs.

Nobody's perfect, and we all make mistakes on the air; but we'll make less of them if we actually *try* to operate well. That's it for another month - see you next time. □

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MFJ-1701 6 way SO239	£30.72 1.50

ANTENNA BITS

HI-Q Balun 1:1 5kW PEP	£13.95 1.50
Brocomm Balun 1:1 1kW	£13.99 1.50
Brocomm 7.1 MHz Epoxy Traps (pair)	£12.65 1.50
Self Amalgamating Tape 10M x 25MM	£4.25 9.75
T-piece polyprop Dipole centre	£1.60 0.25
Small ceramic egg insulators	£0.95 0.20
Large ceramic egg insulators	£0.85 0.20

CABLES ETC

URM 67 low loss coax 50 ohm per metre	£0.95 0.25
UR 76 50 ohm coax dia. 5mm per metre	£0.35 0.10
UR 70 70 ohm coax per metre	£0.35 0.10
UR 95 50 ohm coax dia. 2.3mm per metre	£0.49 0.19
4mm Polyester Guy Rope (400kg) per meter	£0.25 0.19
50mtrs. 19 swg hard drawn copper wire	£19.95 2.00
75 ohm Twin Feeder Light Duty per metre	£0.25 0.10
300 ohm Slotted Ribbon Cable per metre	£9.32 0.10

GOODS NORMALLY DESPATCHED WITHIN 24HRS PRICES CORRECT AT TIME OF GOING TO PRESS — E&OE MAIL ORDER & RETAIL

BREDHURST ELECTRONICS LTD, HIGH ST, HANDCROSS, W. SUSSEX RH17 6BW (0444) 400786
Open Mon-Fri 9am-5pm except Wed 9am-12.30pm. Sat 10am-4pm

ALINCO DR 110 2M 45 Watts!

£299

Receive Option: 140-169MHz.

The new 2 metre mobile transceiver from ALINCO is superb value. Steps of 5, 10, 12.5, 20, 25kHz plus high power make it suitable for a wide number of applications. 14 memory channels and rotary dial control make operation a joy. Improved LCD display makes night operation much easier. The diminutive size (5.5" x 2.5" x 6.75") makes for easy installation in the modern car. Other features include up/down mic., 3 way scanning, 1750Hz tone-burst, reverse input, memory skip, and of course a full mobile mounting kit. Send for colour brochure today!

KENWOOD
YAESU
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MAIL ORDER FAST & FRIENDLY!

ALINCO
DIAMOND
JAYBEAM
TONNA

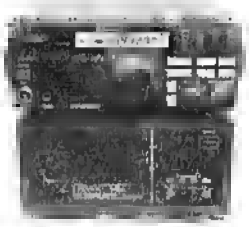
Send for our catalogue and price list

For years we have been operating a mail order service. Now it is even better! Here are the facts!

We have the widest range of ham products in the South. Nearly all products advertised in this magazine are stocked by us. All the famous names and a few lesser ones as well. Our price list contains nearly 800 items. We accept most major credit cards and can arrange budget finance deals if needed.

Each order is entered on a computer and can be traced in seconds. Despatch labels and invoices are automatically generated and most orders received in the morning leave the same day. Each one is carefully packed and fully insured at our own expense. 24 hour Securicor and Datapost is available on request. And if you have any quibbles with your order we are here to put it right quickly and professionally! We take the risk out of mail order buying and our customers keep coming back. That's why we are bigger than most!

HF TRANSCEIVER DISCOUNTS!



Most transceivers are designed for 12 volts. The manufacturer's own PSUs are expensive. But our REVEX "BIG BERTHA" P300 is just as good and a lot, lot cheaper. Fully protected, large hunky transformer, and thermal fan cooled! Below is a list of autumn packages that we invite you to consider! Part exchange welcome. Credit? Most certainly! Just ask for quote.

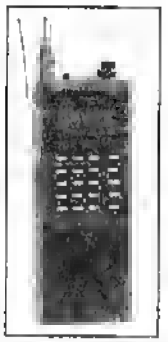
Model Type	Mfr's PSU	REVEX PSU
Kenwood TS440S	~~£1360.00~~	£1200.00
Kenwood TS140S	~~£1035.00~~	£959.00
Kenwood TS680S	~~£1158.00~~	£1080.00
Yaesu FT747GX	~~£918.00~~	£759.00
Yaesu FT757GX2	~~£1228.00~~	£1069.00
Yaesu FT767GX	~~£1858.00~~	£1699.00
ICOM IC751A	~~£1878.00~~	£1589.00
ICOM IC735	~~£1357.00~~	£1069.00
ICOM IC725	~~£1137.00~~	£859.00

The above price comparisons use the manufacturer's nearest equivalent PSU to the P300. Each Revex is fully guaranteed for 12 months as is the matching HF transceiver. All mail orders against credit cards are despatched by 24 hour Securicor at our risk. If payment is made by cheque please allow an extra couple of days for clearance.

A "WORLD FIRST" in SCANNERS!

25-1300 MHz* Handheld JUPITER II

£299



- ★ AM/FM
- ★ Direct up/down tuning
- ★ 5, 10, 12.5, 25, 30 KHz steps
- ★ 100 memories
- ★ 10 programmable bands
- ★ Step change frequency correction
- ★ High speed scan 20 per sec.
- ★ Carrier or audio scan
- ★ Battery Saver
- ★ Telescopic antenna (BNC)
- ★ Fast memo load feature
- ★ Individual memory unload
- ★ Uses 4 × AA cells (Jupiter II)
- ★ Size 7" × 2.5" × 1.5"
- ★ 700 MHz first IF
- ★ Proper English Manual
- ★ Superb sensitivity.
- ★ Does not cover 550-800MHz.

No other similar receivers offer the same features at anywhere near the price! And inside the construction is a Joy! Lots of space, nicely laid out boards all linked with quick connect plugs. Not a "Taiwanese Rat's Nest!

- **Direct up/down control.**

No need to punch anything into memories. Just enter frequency and use up/down buttons for manual or electronic tuning.

- **AF Scan.**

No more annoying blank carriers for the receiver to lock on to. Simply tell it to ignore carriers not containing audio and it will!

- **One Button Memo Read.**

A single button takes you directly into the memory bank. Up/down or scan will quickly move you around or use direct access to a particular channel number.

- **Battery Saver.**

For long term single channel monitoring this feature will reduce battery consumption by 70%.

25-1300 MHz* Mini-mobile/base JUPITER 6000 inc. P.S.U.

£379

- **Skip Function**

Whether you want to bypass a single memory channel or an entire bank, this control provides the answer.

- **High Speed Scan.**

Select high speed scan or search and you will whiz through the range at a healthy 20 steps per second! That means you can scan 100 memories in 5 seconds or 1 MHz of space (25kHz steps) in 2 seconds. It really works!

- **Fast Memo Write.**

Enables you to quickly write into the memories, no need to select a number, the receiver will use the next empty memory.

- **User Friendly Search Programme.**

You can search in either direction and change direction at the press of a button. Total agility with a speed to match.

- **Unique Multiband Programme.**

No less than 10 separate band segments can be stored in the receiver's memory.

- **Total Flexibility.**

The basis upon which the receiver has been designed. It means you tailor the receiver to do exactly what you want it to do, almost like having a receiver that was designed for your own personal needs. No other receiver can match it, feature for feature and the good news is the cost!

World demand is tremendous. We are getting only small quantities so pick up the phone now and you could be lucky!

FREE CATALOGUE & PRICE LIST! We now have an illustrated catalogue of some interesting products for the radio amateur that we have never had the space to advertise. Also details of new items coming along. Just drop us a first class stamp and we will send you this plus our price list of over 700 items!

MIZUHO "MX" QRP SSB/CW RIGS £189

Now in stock these 2 watt single banders for 80, 40 or 20 metres are real beauties. VXO control (one xtal supplied) gives 25kHz segments on 80 and 40, and 50kHz on 20 metres. Features IRT, noise blanker, S-meter, speech proc., CW key, BNC socket. Powered from AA cells or external supply. Packet size 66W x 39H x 142mm deep. As used by GB5BN on Ben Nevis. Over 100 in use already. Send for gen.

A QRP STATION

Free Offer!

Buy a Mizuho 80, 40 or 20m rig and we will give you a set of ni-cads, 12V DC charging lead and a G5RV aerial system completely free of charge! Limited offer so act now!

SPECIAL OFFER THIS MONTH

ALINCO DR510E 2M/70cms Mobile

NORMAL PRICE £549

CASH GIVEAWAY!

SUPER CASH PLUS PART EXCHANGE OFFER

This month we are making a special "cash plus" offer on any working 2M or 70cm mobile. This is your chance to trade up to a really super dual band rig. Phone us for a quote or write giving details of your existing rig. For the price of a phone call or the cost of a stamp you could save £££'s

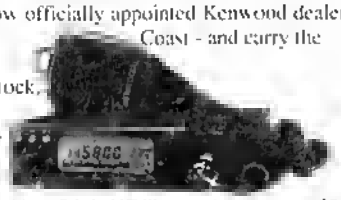
WATERS & STANTON

RETAIL & MAIL ORDER:- 16-20, Main Road, Hockley, Essex SS5 4QS.
Tel: (0702) 206835, 204965
RETAIL ONLY:- 12, North Street, Hornchurch, Essex RM11 1QX.
Tel: (04024) 44765
Visa and Access by telephone. 24hr. Answerphone. Open 6 full days

NEVADA.....TALK TO THE WORLD

TALK KENWOOD

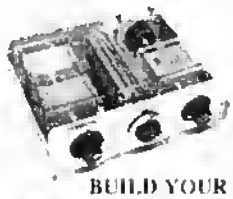
We are now officially appointed Kenwood dealers for the South Coast - and carry the complete range in stock. Heres a selection:-



TS 950SD New Digit HF Transceiver	£3199
TM 231E 2 Mtr mob	£289
TM 431E 70cm mob	£318
TM 701E 2/70cm mob	£469
TR 751E 2m multi-mode mobile	£599
TS 711E 2 Mtr multi-mode(s/soiled)	£799
TS 440S HF	£1138
TS 940S HF	£1995

We always carry a large selection of used eqpt. ring for details

TALK ATU'S



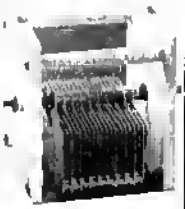
TM 1000 1 KW ALL BAND ATU

Using our unique high power wideband roller coaster this ATU gives effortless matching of all long wire, G5RV,vertical and coax fed antennas. *(Add £5.75 carriage for all models)*

Standard Model TM1000	£168
Balun Model TM1000B	£199
Standard TM1000 Kit Form	£138

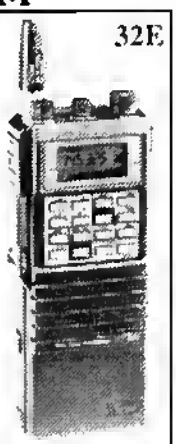
BUILD YOUR OWN AMPLIFIER OR ATU WITH OUR RANGE OF HIGH POWER COMPONENTS

Roller Coaster 30 µH	£28.00
Var. cap 150 pF (4Kw) (4 mag. loops)	£16.95
Var. cap 250 pF 18kv	£19.95
Var. cap 250 + 250 pF 18kv	£28.00
Var. cap 750 pF 14kv	£28.00
Turns Counter (For Roller)	£14.95
Empty ATU Case	£26.00
2kw Balun Assembly	£28.00



TALK ICOM

As ICOM main South Coast dealers we are always pleased to discuss prices, part exchanges and finance.....Give Paul Martin, our ICOM specialist, a call now!



IC - 2SE	Call
IC - 32E 2/70 H/held	Call
IC - 32HE 2/70 Mobile	Call
IC - R7000 Receiver.	Call
IC - R71E Receiver.	Call
IC - 725 HF TCVR.	Call
IC - 735 HF TCVR	Call
IC - 751A HF TCVR	Call
IC - 761 HF TCVR	Call
IC - 765 HF TCVR	Call
IC - 228H 2m/45w.	Call
IC - 448E 70/25w.	Call

TALK SCANNERS

We probably carry the largest stocks of scanners in the UK. Our NEW BUMPER CATALOGUE features all the latest models. Here is a small selection:-

NEW FAIRMATE HP100E THE ULTIMATE HANDHELD

- Freq: 25 - 550 MHz 830 - 1300 MHz
- 1,000 Channels of mem.
- Keypad or rotary control
- AM/Narrow FM/Wide FM
- Search steps from 5KHz to 995KHz.

EVERY SET SUPPLIED WITH:- Full set high PWR meals 2 antennas, carrying case, earphone, DC cable, belt clip shoulder strap *(charger extra £7.70)*

£299

OTHER POPULAR MODELS:-

Black Jaguar MkIII	£199
Jupiter II mobile	£375
Jupitar II H/held	£299
Bearcat 200 XLT H/held	£299

NEW MULTI PURPOSE PRE-AMP

SUITABLE FOR SCANNERS & TRANSCEIVERS

- 25 - 2100 MHz
- Full RG switching for transceiver use
- Low noise GaAs Fet
- Variable Gain
- Band pass filters

Boost reception on your scanner, handheld transceiver, communications receiver with this superb new unit high quality japanese workmanship

£79.95

SCANNER ANTENNAS

Nevada Discone 150 - 700 MHz	£24
WB1300 Discone 125 - 1300 MHz	£59.95
PA15 Colinear (200 - 960 MHz)	£49.95

TALK ACCESSORIES

REMOTE MAST HEAD SWITCH

NEVADA CAS - A2 £49.95

Freq: DC - 1.3 Ghz
Connectors - 'N' Type
Powers 150/300 Watts

SADELTA XL30 Mic

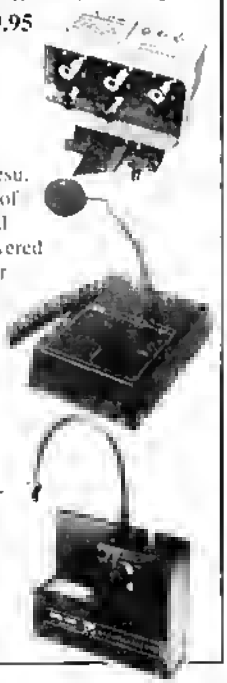
A new electret base mic. that will give your Kenwood, Yaesu, Icom, or other leading brand of Transceiver extra 'punch' and 'clarity'. The mic may be powered from the Transceiver direct or with an internal PP3 battery.

Introductory Offer £39.95

SADELTA CM 40 Mic

As the XL 30 above, but with Vol/Tone controls

Introductory Offer £49.95



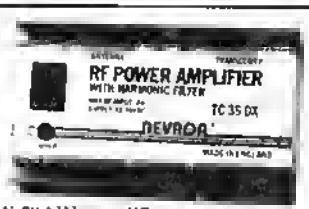
NEW DOCKING BOOSTER

Boost the output of your 2mtr handheld to 25 watts suitable for use at Home or in the car.

Model BS25
For ICOM, CTE, Kenpro
Model BS23
For some Yaesu models
Both Models £59.95

TALK AMPLIFIERS

B300P



TC50IIX 50 MHz amplifier

MOBILE AMPS

B150 180w (26 - 30 Mhz)	£54.95
B300P 300w (6 - 30 Mhz+pre amp)	£147.52
B550P 500w (6 - 30 Mhz)	£237.00
B303 200w (6 - 30 Mhz)	£114.67
TC50 15w (50 - 52 Mhz)	£29.95
HL 66V 60w (50 - 52 Mhz) S/hand	£95
BRL31 28w (26 - 30 Mhz)	£19.95
B250 250w (6 - 30 Mhz) 24 volt	£115
737 80w (26 - 30 Mhz)	£35.41
735 35w (26 - 30 Mhz)	£18.54
B110 110w (142 - 170 Mhz)	£145

BASE AMPLIFIERS

B132 240w (3 - 30 Mhz)	£129
BV131 250w (26 - 30 Mhz)	£115
B507 300w (3 - 30 Mhz)	£278
HL1K/6 500w (50 -52 Mhz)	£695

SEND IN NOW JUST £2 FOR OUR NEW BUMPER CATALOGUE (INCLUDES £2 VOUCHER)

NEVADA COMMUNICATIONS.....WE TALK YOUR LANGUAGE

189 LONDON ROAD, NORTH END, PORTSMOUTH, PO2 9AE, ORDER HOTLINE 0705 662145

IC725 HF Transceiver £759

TEST THIS RIG 'ON AIR' BEFORE YOU BUY, AT THE

KW 'EMPORIUM'!!

Put the new rig of your choice through its paces on the air before you decide to buy. At the 'Emporium' we have the aerials, we have the rigs and we have the time to sit with you to ensure that you are 100% happy with your prospective purchase. We believe that every new sale puts our reputation at stake! Our 36 years in the amateur market is your guarantee of complete satisfaction and first class, after sales service in the years to come.

AVAILABLE FROM STOCK NOW!

We also stock — Antennas: Hy-Gain, Butternut, Cushcraft, 'J'Beam, KW. ATU's — MFJ, TenTec, KW, Kenwood, Yaesu, ICOM. Amp Linear Amplifier, Rotators, Books, Cables, Wire, Scanners, Airband Receivers, Microphones, Morse Keys, Full range of accessories.

TEN TEC

OMNI V Transceiver Amateur Bands 10-160M	£1,900.00
PARAGON Transceiver + General Coverage	£1,839.00
CORSAIR II Amateur Bands 10-160M	£1,200.00
ARGOSY II Mobile or Base HF SSB/CW	£589.00
CENTURY 22 CW Transceiver & QRP	£399.76
TITAN Linear Amp 1,500W 10-160M	£2,171.00
HERCULES II Linear Amp 500W 13.8V	£839.00
HERCULES II PSU 100 Amp	£660.00

YAESU

FT767GX Transceiver Gen. Cov. RX	£1,599.00
FT747GX HF Transceiver SSB/FM/AM	£655.00
FT757GX HF Transceiver 10-160M	£969.00
FT212RH Transceiver 2M, 45W	£309.00
FT290R2 Mobile 2M, Multimode	£429.00
FRG8800 Receiver 0.15-30MHz	£649.00
FRG9600M Scanning RX 60-950MHz	£509.00

2M/70CM Mobiles & Handhelds in stock etc

ICOM

IC751A HF Transceiver Gen. Cov. RX	£1,500.00
IC735 HF Transceiver Gen. Cov. RX	£979.00
IC725 HF Transceiver Gen. Cov. RX	£759.00
IC7000 Receiver 25-1000+1025-2000MHz	£989.00
ICR71E Receiver 0.1-30MHz	£855.00

2M/70CM Mobile & Handhelds in stock etc

KENWOOD

TS940S HF Transceiver, Gen Coverage	£1,995.00
TS140S HF Transceiver 10-160	£862.00
TS680S Transceiver 10-160+6M	£985.00
TS440S HF Transceiver Gen. Coverage	£1,138.00
TL922 Linear Amp	£1,495.00
TS790E Allmode Tcvr 2M/70CM + 1296 MHz	£1,495.00

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TS950S HF Transceiver	£2,499.00
TS950SD HF Transceiver	£3,199.00

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KW's policy continues as it has done for the past 36 years — to give the customer value for money including the best service available. Every unit is tested in our TEST DEPT before delivery. We do not believe in sending out sealed packages.

Lots more "Goodies" — Trade-in equipment, servicing. EXPERT ADVICE is FREE. Write or phone for brochures.
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KW COMMUNICATIONS LTD

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GAREX ELECTRONICS

WEATHER SATELLITE SYSTEMS

SPECTACULAR NEW ATARI ANIMATED SYSTEM

Garex are proud to announce that they are the first appointed dealer for this incredible new Timestep product. Following on from Timestep's phenomenal success in the education market a special low cost Atari ST version of their animation system is now available. Simply plug in your existing receiver to view amazing pictures. For the ultimate, add a Meteosat receiver for unbelievably smooth 14 frame animation that is completely automatic once set up. Just watch the clouds roll by! New pictures are added (wice an hour if required, the oldest being discarded automatically. This sophisticated package will run on any Atari ST1040 and compatible colour monitor, comes complete with all software and colour-keyed Atari interface unit £299.00
Optional 16 grey scale adaptor for colour monitor £24.95
For those who would like a one-stop-shop, we offer the complete package of a ready-to-run system
Meteosat Dish and receiver, Atari interface unit, Grey scale adaptor, 14in Colour Monitor, Atari ST1040 computer, software (including demo-disc) AND, OF COURSE, ALL PLUGS AND CABLES
On your doorstep £1,695.00

NEW COMMODORE "AMIGA" INTERFACE AND SOFTWARE

Superb high resolution pictures 600 pixels x 400 lines. Compatible with "PIXmate" THE fully featured image processing program £299.00

COMPACT FRAME STORE SYSTEM

The basic MICROWAVE METEOSAT system, no complications, a complete plug in and go package requires no computer, no software, and can be up and running, including dish alignment within 10 minutes. Nothing more to buy. Dish, Microwave Receiver, Frame Store, 12in b/w Monitor AND ALL PLUGS AND CABLES. Designed by Timestep, supplied by Garex £995.95

SATELLITE ACCESSORIES

Meteosat Receiver. Dish input and 2 watt audio output	£270.25
Meteosat Preamp. 15dB gain 0.6dB noise figure GaAs FET	£92.00
NOAA 10 channel VHF Receiver	£155.25
NOAA BASIC Turnstile antenna	£34.95
NOAA BASIC Preamp, 3 pole filter, boxed, 14dB gain	£24.95

SAE for full details and prices of other 'separates'

* * * *

GAREX VHF RECEIVERS

★ A simple but versatile design capable of covering spot frequencies in the range 25-200MHz
★ Excellent sensitivity (typically 0.4uV for 12dB SINAD)
★ Double superhet (10.7MHz and 455kHz IFs)
★ Choice of IF bandwidths from "W-SAT" to "12.5kHz" PMR standards
★ The basic receiver is single channel crystal controlled
★ Multichannel option
★ 2 watt audio output stage having a low quiescent current
★ Size 153 x 33 x 13mm ★ Requires 10-14V DC supply

PRICES Stock Versions (fully assembled, aligned and tested boards) 6m, 4m, 2m and weather sat	£49.95
Crystals extra, prices on request	
★ Mains power supply module	£15.50
Other frequencies, special options, cased versions	POA

GAREX VHF PREAMPLIFIERS

★ MINIATURE — GENERAL PURPOSE ★

★ Compact size 34 x 9 x 15mm ★ Up to 26dB gain
★ Can be made for any frequency in the range 40-200MHz
★ 3dB bandwidth +3MHz (at 145MHz) ★ Low noise
★ Input and output impedance 50 ohms
★ 1dB compression +10dBm ★ Saturated output +15dBm
★ Supply voltage 8-17V DC at 5-10mA

Stock Versions (fully assembled, aligned and tested boards) 6m, 4m, 2m and Weather Sat	£11.45
Airband 118-136MHz (reduced gain)	£11.45
Other frequencies in the range 40-200MHz	£13.75

★ HIGH PERFORMANCE ★ 2 metre PRE-AMPLIFIER

★ 3 band-pass stages for improved selectivity
★ 16dB gain with 1dB NF ★ Switches 35 watts
★ RF switched (fail-safe action) gas-filled relays

Assembled, tested pcb	£42.50
Boxed version	£49.95
Gas-filled Relays as used in pre-amp	£4.95

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R.A. KENT ENGINEERS

BEST VALUE IN MARKET

The **LEADING** British manufacturer of top quality Morse Keys - renowned throughout the world for their outstanding performance and reliability.

SOLID BRASS MORSE KEY

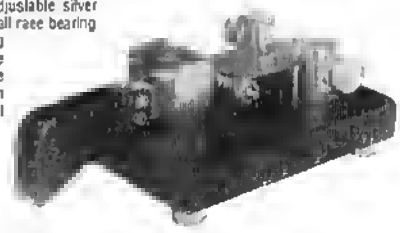
The Kent hand key is used world wide by professional and amateur operators alike. The silver contacts are mounted in precision fine pitch threaded screws fitted with positive locking nuts which are instrument knurled for ease of precise adjustment.
Our shielded ball race bearing pivots are renowned for their superiority over all keys using plain and bush type bearings.
The key is available in kit form or ready assembled. The kit takes less than an hour to complete, resulting in a key of unrivalled professional standard.
£38.00 (assembled) **£31.00** (in kit form) Plus £2.50 post and packing

TWIN PADDLE MORSE KEY

Our twin paddle morse key has been designed and precision engineered to the highest standard. Shielded ball race bearings together with fine pitch screw threads and instrument knurled heads allow precise and individual adjustment of contacts and springs.
Available ready to use or as a kit taking about an hour to assemble.
£47.90 (assembled) **£39.50** (in kit form)
Plus £2.50 post and packing

SINGLE PADDLE MORSE KEY

Because most Operators prefer to select their own contact gap and spring settings it is not possible to have a satisfactory optimum setting for all. With this in mind, we have designed a single paddle key with fully adjustable silver contacts and spring tensions. Ball race bearing pivots together with the twin spring arrangement ensure a positive return of the key arm to the centre position. Machined parts are from solid brass and mounted on a steel base for stability.
£38.00 (assembled)
£31.00 (in kit form)
Plus £2.50 post and packing.



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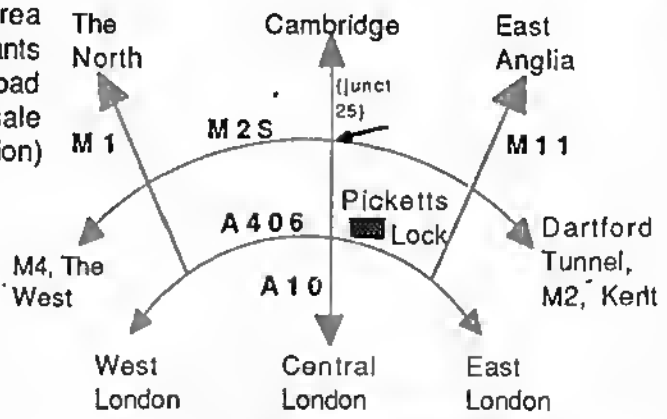

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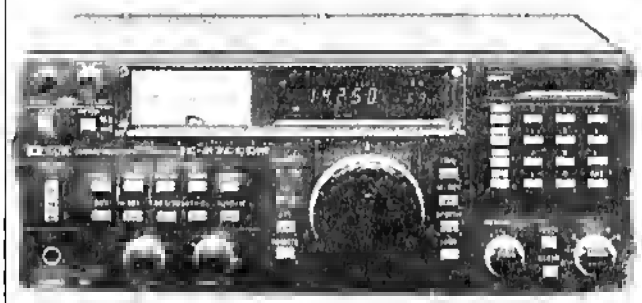

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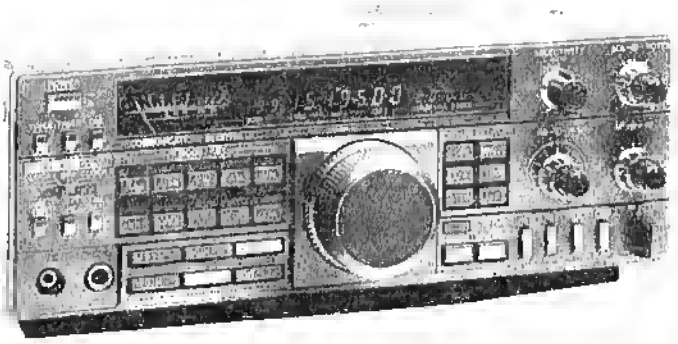

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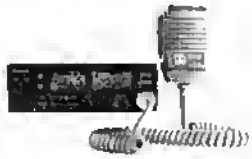

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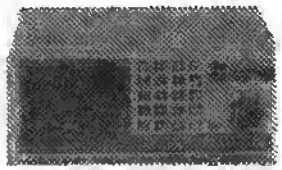

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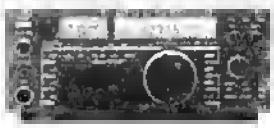

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BBS/Mailbox standardization?

This month has seen the general release of the new software from Steve Coleman, G4YFB: it also has seen the release of G1NNA ver 1.04 and multi-connect multi-lingual software from John Paul Roubelat, F6FBB. This release (ver 5.06) looks at your callsign and 'knows' which language to respond in.

The problem we are all faced with now is which format should we be looking at? We seem to have come to the position that many commercial companies arrived at many years ago with audio tape. How do we set a standard?

Why do we need a standard you may be asking? At the last meeting of the British SysOps two new methods of addressing a message were looked at, both completely different to the system we use now: neither will work with all three systems mentioned above let alone the many other Mailbox software packages currently in use.

I am certainly not saying that so many software writers should all get together to produce the ultimate package, but if they all worked to a set of guidelines that must be followed then we would not have the incompatibilities we are generating.

As for the two new mailbox packages I have mentioned, full reports will follow over the next few months. At this stage I am still trying to translate the French software installation manual, as although it can speak to you in English when you connect to it, it was written for the French market.

Dedicated Radio

The French packet group ATEPRA led by Remy Jentes, F6ABJ, has been designing a two metre transceiver aimed at the packet enthusiast. The single channel 10 Watt transceiver will be available in kit form and boasts some very impressive specifications. Atepra claim the response time to key up the transmitter on the prototype version to be just 0.9 milliseconds.

At this time Beta testing is taking place in France but should you require further information it can be obtained from ATEPRA, 23 Rue de Provins 77520 Mons en Montois France. As ATEPRA is a voluntary group and the project is being carried out on a non-profit making basis please can you include two IRCs with enquiries and ensure your letter is written in clear English, or preferably in French.

New PCB from BARTG

BARTG have announced a new filter kit with a tuning range of 40Hz to 3600Hz in 100Hz steps. The filter is based on an article that appeared in *QST* April 1986 and is designed with two filters in series. One high-pass the other low-pass. Typical tuning settings will give passbands of 1271Hz and 1491Hz making it very suitable for AMTOR and RTTY. They also claim that it may effectively reduce computer QRM. More information from Mr E Hatch, G3ISD, on 0795-477431.

Dosgate

I reported a few months ago about a program called DOSGATE by Rich Bono, N1MD. At last I have managed to obtain a copy and have run it up as a separate system to the mailbox. The software is a shell type program that links the PC to a TNC via a serial port and allows a connected user full access to the computer, but it does have its drawbacks. It is supplied with an editor that takes over from the normal Disk Operating System (DOS), which allows the SysOp to disable some of the PC's commands. This stops the user from formatting the hard disk etc. As for software that will run for the user, it has many more limitations than I first reported.

Any program that has any screen handling can be run but not seen at the other end, therefore if the user tries to run one of these packages the computer will continue as normal but the user will see nothing; since the user has absolutely no idea of what is taking place he cannot escape from the program. The machine has normally stayed in this state until it has been manually re-booted.

Text based programs will work very well indeed and some designed for use with DOSGATE, with radio related subjects are available.

The system comes with its own mail package, allowing the user to send, read, kill etc, but at this time I have found no method to send these messages on to the next mailbox.

It has one large drawback that at this time cannot be solved - the software uses direct calls to the Bios and will not look at any NODE software such as G8BPQ, so to implement it it is necessary to have two TNCs back to back for the connection to the NODE.

If you would like to implement this and have some software ideas for it then drop me a line and I will send you a copy.

Back in time

4 years ago...

The first explanation in *RadCom* of AX.25. Packet had hit the news and, an appeal at that time was for anybody giving talks on either Packet radio, RTTY or Amtor to contact the writer so that he may publicise their names.

3 Years ago...

Connect International made the news 3 years ago with discussions on Automatic Routing, full circuits for 9600 Baud operation and an article explaining how your TNC could look up while you were eating your dinner (not a lot's changed with that.)

The best part in *Connect International* was a complete list of all known AX.25 stations in operation in this country. Would anybody like to compile a list today?

Spacecraft	Oscar No.	Freq. MHz	Mode	
UoSat D	UO-14	435.070	9600 bps AFSK	AX.25
UoSat E	UO-15	435.120	9600 bps AFSK	AX.25
PACSAT	PO-16	437.025	1200 bps PSK	AX.25
DOVE	DO-17	145.825	1200 bps AFSK	AX.25
WEBERSAT	WO-18	437.075	1200 bps PSK	AX.25
LUSAT	LO-19	437.150	1200 bps PSK	AX.25

Microsat

The latest information I have just received (12 Jan) is that a new Launch date has been set for Saturday 26 Jan at 01:35 UTC. Pierre Collet, Mission Director of the UOSAT launch announced that there would be a delay due to the failure of an Inertial Reference Platform, but by the time you read this it should all be up and running. The table printed here is available thanks to AMSAT.

Packet transmission from DOVE may be monitored with an unmodified TNC-2 or clone, using an FM receiver. The other Microsats (PASCAT, WEBERSAT and LUSAT) require an SSB receiver and TNC with a 1200 bps PSK demodulator (FO-12 compatible, NOT the 400 bps PSK demodulator used with AO-10 and AO-13). The 9600 bps modulation scheme used by the UoSats is compatible with the G3RUH modem. This is certainly going to be the year of Sat/Packet, and I will try to keep you informed of any changes.

9600 Baud mod of the month

This month the modification is for the Yaesu FT-211RH. Thanks for it are due to Chris Lorek from SMC.

The FT-211RH has been shown to be suitable for 9600 baud packet operation. There is no major surgery required just two screened leads are required, one for TX AF the other for RX AF connected as follows.

RX Audio

On the RX IF Unit (sub board F2869104) connect the screened lead inner to the TK10420 IC pin 9, with the outer screen to pin 15. Caution should be taken to solder these if soldered to the underside of the board.

TX Audio

On the rear of the main PCB a small potentiometer will be seen, (peak deviation adjuster). Unsolder the leg nearest to the rear of the set, and connect the inner of the screened TX lead to this point. The outer to the earth plane adjacent to this point. To ensure that the 9600 baud modem is terminated in the required impedance, it is essential that a suitable terminating resistor be placed across the screened lead inner/outer, eg a 560Ω resistor; this may usefully be done at the FT-211RH Potentiometer connection.

No further adjustments need to be made to the radio. On the tested modem a suitable level of 2.5kHz deviation was achieved with one third rotation clockwise of the modem TX AF level potentiometer.

HF stations

Lastly this month a couple of stations to keep your ears open for on the HF bands.

Gwyn Morgan, GW4KYN/T5GM will be operational very shortly from Mogadishu, Somalia. Gwyn is the last remaining amateur still operational in Somalia and can usually be found on Tuesdays 1800 UTC on or about 14.132MHz.

Gervase Chavasse G4URJ/7P8DR is operational mostly on RTTY and AMTOR on 15 metres from Lesotho. Anyone wishing to contact him can do so with a packet message @ZS6SAT where he is a regular user.

SATELLITES

ARTHUR GEE, G2UK
21 Romany Road, Oulton Broad,
Suffolk NR32 3PJ.

My first contribution to this column, brought in some interesting mail, for which many thanks. Generally speaking it could be divided into two classes. There were 'thank you' letters from those newcomers who expressed their gratefulness for the attention I promised to their needs. And then there were those who assured me that in spite of their having spent an awful lot of money on satellite equipment, they still hadn't been able to hear any satellites, let alone work any!

To the latter I would say, 'start right at the beginning' and 'Keep it Simple'. To the former I would say, 'Be patient, we'll cover your difficulties in this column in due course'. My second contribution, which covers 'Finding the Satellites', has not appeared in print yet at the time of writing, but I hope when it does it will help those having trouble with their orbital predictions. To those who have all the gear needed for a good satellite station, but who inspite of this have not been successful, I say again, get a copy of Richard Limebear's *Guide to Oscar Operating* from AMSAT-UK HQ, 94 Hrongate Rd., E12 5EQ. Price £2.25. In this publication you will find the answers to most of the questions you asked in your letters.

By the time you read this, all going well, we should have six or so new satellites to listen for. Accurate details of these will be promulgated when official data is available.

Receivers

This month a word or two about receivers. Taking the simplest case, i.e. that of using a normal SW receiver or amateur bands transceiver and listening for the Russian RS series satellites, i.e. RS 10/11, which have their down-link in the 10 metre band around 29.360 to 29.400MHz; using the information given last month about orbital predictions, there should not be too much difficulty in finding their signals provided your receiver isn't 'deaf' at this frequency. The average amateur bands receiver, even though they are built to cover the 10 metre band, may at the top end of the band — where the satellites are — be a bit 'deaf'; and you may not be able to hear the satellites signals if they are rather weak. The writer has a SW receiver — quite a well respected one — on which it is quite impossible to hear signals at the top end of the 10 metre band. On the other hand, the receiver on the main shack transceiver is excellent on 10 metres and gives good satellite reception without any preamplifier or special aerial. If your receiver is 'deaf' on 10, try a preamplifier which usually does the trick. They are available made-up or in kit form. AMSAT-UK does a 28MHz Preamplifier PCB at £2.05.

One cause of difficulty can be that when 10 metres is 'open', as it is at the time of writing, the QRM from stations using this section of the 10 metre band — in spite of requests to leave it free for satellite operation — and clutter from commercial radio station harmonics, may swamp the satellite signals. There's not much one can do about this, except wait for conditions to improve. One other point worth mentioning is that it is far more sensible to listen for the CW signals from the satellite than the phone ones. There are more CW signals than phone and it's far easier to read CW than phone when conditions are poor.

Another problem which may confuse the newcomer is that the signals from the satellite may fade, varying in strength from quite strong to almost inaudible. This QSB is rhythmic and is due to the satellite rotating during its flight thus altering the profile of its antenna with respect to the earth station's aerials. This effect is more apparent when a simple aerial is used for receiving such as a dipole or long wire on 10 metres. More complex aerial systems such as Yagi or helical beams can be used to reduce this effect.

So far we have considered the easiest option in satellite reception, that is the reception on 10 metres of the RS 10/11 system. However, most of the present satellites send their signals back to earth on the VHF bands, two metres being one of the commonest frequency band used. In this case, we have to use a rather different technique. When we turn our attention to satellites using down links in the higher frequency ranges, things are not so simple. The UoSAT satellites, built and operated by the University of Surrey Spacecraft Engineering Dept., whilst not intended for amateur radio style communication but for Scientific and Educational use, are very useful indeed for getting started on amateur radio satellite communication using the VHFs. UoSATs send signals down to earth on 145.825MHz. These signals can quite easily be heard on a 2 metre tunable receiver. If you do not have a 2 metre tunable receiver, you will need a 2 metre converter ahead of your shortwave receiver. These usually convert the 2 metre signals into 10 metre signals which are then fed into the aerial input of the receiver. If your receiver does not cover the 10 metre band, it is possible to get a converter to cover other frequencies you may have.

The aerial system used for VHF satellites has to be rather more complex than that used for the 10 metre down link we have already considered. But it does not need to be all that complicated. One of the most favoured types, especially when reception of the UoSATs only is required, is the ground plane. This is useful for receiving signals from satellites passing overhead and is to be recommended for the newcomer to satellites. As one acquires experience, more directional types of antenna can be used such as the Yagi. This needs some form of rotator mechanism so that it can be turned to actually point at the satellite. The more elements the Yagi has, the narrower will its reception beam be, which makes it more difficult to track, but at the same time the stronger will be the signal it delivers to the receiver. Still further enhancement of the signal can be obtained by providing means for altering the elevation angle of the antenna, but this usually entails means of altering the vertical angle requiring considerably more complicated rotator mechanisms.

The accurate tracking which a horizontal and a vertical tracking mechanism will provide, greatly increases the signal strength of the received signal, but it is not necessary for satellites such as those of the RS 10/11 and UoSAT types. When you come on to satellites such as Oscar 13, things are a bit different, as we shall see.

News

Congratulations to AMSAT-UK Hon. Secretary Ron Broadbent, G3AAJ, who has been appointed as the first IARU Region 1 Satellite Co-ordinator. Commenting on this appointment, the American newsletter *Westlink Report* says "Ron, who is the long-time Secretary of AMSAT-UK, also is Editor of the United Kingdom publication *Oscar News*. His in-depth knowledge of the amateur satellite communications scene and his ability as a communicator make him the ideal person to assume this newly created post" — sentiments we heartily endorse.

One of the most difficult things in the amateur radio satellite sphere, has been to get all the interested parties to work together. It was natural enough that when amateur satellites first 'took-off' various projects were started in those countries with the technical knowledge to participate. On both the East and West Coasts of America, projects were started by enthusiasts who brought into being the earliest amateur radio satellites. Similarly Australia provided a team who contributed towards the earlier satellite construction projects. In England, AMSAT-UK fathered the interest, which was developed in a remarkable way by the spacecraft team at the University of Surrey. Similar activity began in the USSR, in Germany and in Japan. As things progressed, most of the technically developed countries got interested and groups of enthusiasts were formed to further the interest in amateur radio satellites.

It very soon became apparent that some sort of organisation should be set up to co-ordinate all these groups, so that their activities could be pooled thereby saving expense and effort. Throughout the development of amateur satellite activity, numerous attempts have been made to bring together all these activities, but the inevitable difficulties of co-ordinating worldwide activities, made the going slow. During the past few years, the opportunity presented by the annual Colloquium at the University of Surrey, gave one the chance of bringing together representatives of many of these groups and as a result, we now see definate co-ordination taking shape. The International Amateur Radio Union is obviously an organisation which can help this co-operation along as much as anyone, and Ron's appointment to its Region 1 is very encouraging.

Another encouraging event in this direction was an invitation for Ron, as AMSAT-UK's Hon. Secretary, to attend the AMSAT Board Meetings at Des Moines, USA, for their AGM. One of the most important things he did there, was to advise their members about the forthcoming IARU Region 1 Tri-Annual Conference in Spain this year at which future frequencies for amateur satellites will be discussed. Officials in all AMSAT Groups are very concerned that we may lose allocations at the WARC 1992. This problem is very near to home in the USA, as they nearly lost their 220MHz band to UPS, the Parcel Carriers. UPS have already tried their luck by putting a Repealer in that band at Dallas, Texas. The UPS Company has recently extended its activities to this country, so we may have similar problems here.

Ron took the opportunity of visiting Doug, KQ5I, in Paris, Texas, with whom he had useful talks about the future of co-operation between all AMSAT Groups. From Texas, Ron went to see Ross, WB5GFJ, in Los Altos Hills, just south of San Francisco, where he experienced a couple of small earthquakes, the aftermath of the 'Big One'! Ross is President of the Project Oscar Group, who built the first OSCAR, AO-1. Ross has part of the original curved base plate of the prototype AO-1, which fortunately was not damaged by the 17 October earthquake. Ron was able to discuss with the Group there numerous aspects of the satellite scene, such as future building plans, the exchange of computer hardware and software etc. All in all, a working fact-finding tour well calculated to bring amateur satellite activities together.

New Program

A new program for Spectrum users is now available on tape, which includes the ability to input the new Microsats and UoSAT D and E. By G4HLX; available from AMSAT-UK at £12.50.

MICROWAVES

MIKE DIXON G3PFR
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Winter Tropo

Pre-occupied with other matters (finalising and updating the texts and figures for Volumes 2 and 3 of the new RSGB *Microwave Handbook*, amongst other things!), I missed the tropo opening at the beginning of December, 1989, which appeared to extend well above 432MHz and well into Europe - at least as 'seen' from Northern Ireland. A welcome letter from Geoff, GI0GDP (Carrickfergus, Antrim, IO74CR), gave considerable detail of his activities on 3 December during which he worked some 15 stations in nine different squares, the majority at good DX for any VHF/UHF band.

Transmitting and receiving using an FT290R to give 30W from an LMW transverter followed by a single 2C39 PA and four by DL6WU type Yagis, plus masthead GaAsfet preamplifier on receive, Geoff's day effectively started at 09.30hrs with a contact to Ela, G6HKM, in JO01FT. Although only 5/2 was sent, the contact was completed successfully. From 12.56hrs on, things really opened up and several contacts into PA/PE and ON followed within the next hour. From 14.00 to 16.25hrs, contacts into the south-eastern parts of the UK came at increasing strengths.

At 20.40hrs, DL2KBB was worked at 5/9, followed by 5/9 OSOs into the extreme SE corner of the UK - East Anglia and Essex. Geoff remarked that from 07.00hrs onwards, the RSGB beacon GB3MHL (ORB in excess of 600km) was being received at S9+, but there was no DX audible until G6HKM's signal appeared - could this have simply been lack of activity? His QSO with DL2KBB was 'tail-ended' by GI4OPH (whose OTH is at sea level). Whilst Geoff was receiving signals at 5/1 at his 200ft ASL location, GI4QPH's report to the DL station was 5/9 - and vice versa - another case of low-level ducting across the first few miles of Irish Sea take-off lifting signal levels differently at different places? I understand from Sam, G4DDK, who recently visited GI4OPH, that GB3MHL is audible at "OPHs OTH most of the time."

Geoff's other comment was that "a GI beacon would have been useful" - (to indicate conditions to distant stations) - "although someone appeared to be operating a personal beacon (unidentified) on 1297.000MHz, the same frequency as GB3MC - a poor choice of frequency." I guess that GB3MC could be almost line-of-sight to several parts of GI and therefore very strong, under even minor lift conditions, since the Mourne Mountains of GI can be clearly seen from the Winter Hill site of GB3MC when visual conditions allow.

Readers are reminded that the RECOMMENDED FREQUENCIES FOR ATTENDED PERSONAL CALLSIGN BEACONS (unattended personal beacons are NOT authorised on this band, although formally licensed unattended beacons are) lie between 1296.300 and 1296.400MHz, ie adjacent to the narrowband DX frequencies.

These recommendations, amongst others, were published here some time ago but in much more detail in 'Microwaves at Sandown, 89' an account of the proceedings of the 1989 National VHF Convention. A few copies are still available from me (QTHR) at £1.50, post paid - the other information contained therein concerns 'Propagation above 10GHz' (G8AGN), 'Microwave Television' (G8LES and G4CRJ), and 'Packet Radio by Microwaves' (G3YAC).

IARU and WARC

The 1.3GHz band recommendations mentioned above form part of those which will go forward to the IARU Region 1 VHF/UHF/Microwave stream of the Triennial Conference in Torremolinos, Spain, in April this year, as the 'UK national variations' to the Region 1 (general) bandplans. As mentioned last month, the other major need is to seek common microwave (particularly primary narrowband) allocations with neighbouring Region 1 countries, to enable and ensure the future of DX working and experimentation. These also suggest that other Region 1 societies should seek relaxations in their amateur licence schedules similar to those granted by the DTI to UK amateurs in January, 1989. Only by combining agreed 'common' frequencies with 'common' licence facilities will the ultimate aim of a truly 'common' CEPT licence be attained. There is already much 'commonality' at frequencies below 30MHz and at 144 and 432MHz, although 50 and 70MHz still present problems as do many of the microwave bands!

This is a singularly important conference, being the last major Region 1 conference before WARC 1992 and the last before full implementation of the 'common' CEPT licence which will apply across 'greater Europe' following unification in the same year.

WARC 1992 is also scheduled to take place in Spain and it is very important that all IARU regions present a united front in representing amateur interests, particularly at microwave frequencies where there is potentially most to lose. Time is running very short and you are urged (as previously) to put forward your views to me, the Microwave Manager or any other Microwave Committee member as soon as possible... if not sooner! At least the RSGB representatives will then be aware of the latest views of users, even though these last-minute thoughts will not enjoy the status of a full, formal (paper) presentation.

Other Publications

Some many years ago the DARC (German) publication *UHF-Unterlage*, Teile 1 and 2 (better known to British amateurs as *The UHF Compendium* parts 1 and 2) was available in English translation. This covered a variety of topics in the VHF/UHF and microwave fields, mainly for the bands up to and including 1.3GHz, although there were odds and ends for some of the other bands tucked away inside it.

The second volume, Parts 3 and 4, after several years' delay in translation is now available in English and extends the first volume with a number of practical designs for some of the higher bands as well as some of the more advanced techniques for the VHF and UHF bands. Some 400 pages of information are contained within its covers - some designs may be difficult for UK amateurs to reproduce since many of the semiconductors used are not easy to come by in the UK. There are also a number of typographical errors and a few areas of text where the translator has found it difficult to identify the appropriate English phraseology. Notwithstanding these small shortcomings it should be a useful addition to the bookshelf with many practical ideas for relatively simple home-construction.

Its International Standard Book Number is ISBN 3-88692-010-0 and, with postage from Germany, comes out at 60.50DM (about £23 at the present rate of exchange). It can be obtained directly from the publisher, DARC Verlag, Lindenallee 6, D-3507 Baunatal, West Germany or from the publishers of *VHF Communications*, UKW-Technik Terry D. Biltan, Jahnstrasse 14, PO Box 80, D-8523 Baiersdorf, West Germany.

The last two issues of *VHF Commmunications* have contained the first two parts of an article on an all GaAsfet transverter system for 10GHz, by Jurgen Dahms, DC0DA. The UK agent for *VHF Communications* is Mike Wooding (well known to members of BATC), G6IQM, whose address is 5, Ware Orchard, Barby, nr Rugby, Warks CV23 8UF. For new readers who are not familiar with this publication, it is a quarterly publication devoted entirely to VHF/UHF and microwaves. Again, like the *Compendium* mentioned above, it may be difficult to obtain some of the components in the UK, although the majority of designs are supported by kits or part kits from the publisher.

SWL

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VHF award news

Ian G4OUT wrote enclosing a proof copy of the UHF/VHF Awards section of the 1990 Society Callbook so that I can provide details of the various categories of Award available to the listener at UHF/VHF. It might be worth making SWLs aware of the rules for these awards, in the hope that a few more will take the time to submit claims to G4OUT.

The awards on offer, free to Society members, are the 50MHz Countries Award, the 50MHz DX Certificate, the 50MHz Squares Award, the 4-2-70 Squares Award, the VHF Countries and Counties Awards, the Microwave Award, and the Microwave Distance Award.

The basic requirements for all seven awards are that you must have QSL cards to support your claim. For the various squares awards, the IARU (Maidenhead) locator details must be shown. A card without a Maidenhead locator originally printed on it is acceptable provided that it bears some adequate form of positional information — for example an old locator or latitude and longditude — in which case the Maidenhead locator square designation can be clearly added to the card by the listener. Another important thing to remember is that when sending your claim and cards, sufficient return postage MUST be included.

As everyone will know, the 50MHz awards are quite new and only one SWL claim has yet been received by G4OUT. For those listeners with 50MHz converters it might be useful to explain what is required for the three awards. The basic 'Countries Award' is for proof of confirmation with 10 countries, stickers are available for increments of every ten countries heard. The 'DX Certificate' takes account of the potential for cross-band working and there is no stipulation on the band used for the incoming signal. Quite a few listeners could probably claim this one if they spend their time listening around 28.885MHz and have cards to support the fact that the station heard was working cross-band to 50MHz. The initial qualification for this Award is 25 countries, with stickers for every 25 countries confirmed. The 'Squares Award' qualification starts at 25 squares. Squares in any country qualify provided that operation from that country is formally authorised. Additional stickers will be provided when proof is submitted of hearing 50, 75, 100 and 150 squares. I shall recap the rules for the 'Countries and Counties Awards' at a later date.

VE8RCS

Several issues ago, I mentioned receiving a letter from Mike Parent

The shack at VE8RCS showing Mike Parent at the operating position. The station comprises an FT767GX, a Nye Viking ATU, a Kenwood 220 Skelton Monitor, plus phone patch equipment.

BRS88763/568 who lives in Canada. He promised some information about VE8RCS, which has now been received. Mike provided much news about the station which will be of interest to all readers, so I intend to serialise it over the next couple of issues.

VE8RCS is the club station of the Polar Amateur Radio Club. It was established in the '50s mainly to provide phone-patch facilities for the station personnel, but also for back-up communications should regular means of communication fail. Even to this day, operators must 'beam south' after any operating just in case regular communications go down. In this way, if the antenna rotator should also fail, the necessary day-to-day communications can still be made.

VE8RCS is in CQ Zone 2, and is therefore in a much sought-after zone. Its co-ordinates are 82 degrees North and 62 degrees West. The station is located at the tip of Ellesmere Island some 450 nautical miles from the North Pole. It is reportedly the most permanently inhabited northerly spot in the World — which according to Mike is nothing to brag about!

The terrain is 99.9% dirt in the Summer and 100% snow in the Winter. There is some plant life in the summer, but nothing of any great note. From February to August there is 24 hours daylight, enabling the team to take a break from a pile-up at 0300 and take a walk outside as though it were 1500! From August to February it is 24 hour darkness, meaning the operators have nothing much to do apart from being on the air most of the day — work permitting. Temperatures in the summer can rise to a 'pleasant' +10° centigrade, but in the winter temperatures of -40° centigrade are commonplace. Strong winds make it an even more inhospitable place, and it is advisable to wear full Arctic kit just to survive.

The station complex is quite comfortable, housing kitchen, sleeping quarters, infirmary, library, dark room, 3 bars and TV room. The site also houses an FM radio station, with the callsign CHAR on 105.9MHz. Most of the tapes emanate from CBC and are sent every two weeks.

As I have explained before, not all the operators are licensed, like Mike Parent. They are communication researchers by trade. However, a two month training course has to be completed, and once on site, they have to operate under supervision for one further month. A really professional attitude is shown by all the operators to ensure that the station is run to the highest amateur standards.

Next month, we will look at the station itself, the operating, the pile-ups, and what the team have in mind for the future to try to make VE8RCS more widely available to those who prefer the more diverse modes of amateur operating.

Newcomers

A couple of newcomers this month — Nick Robinson RS92707 and Harold Percivall, who failed to provide his BRS No. Nick has the sort of problem that many youngsters have to experience: his parents do not like the idea of antennas cluttering up the house or garden! His main interest is 144MHz and he uses an AR900 scanning receiver. He currently has a Slim Jim inside the house, but obviously wants to get a more efficient antenna capable of pulling in some DX, without upsetting his parents. He would like to hear from anyone who has experienced, and solved, the problem, or who has any ideas which his parents might approve of. Yagis for VHF are not dissimilar to TV antennas and it is a popular belief amongst amateurs that one on the chimney stack does NOT look unsightly. However, one other suggestion might be to see it Mum and Dad are prepared to tolerate a rotatable beam in the loft on the principle of 'out of sight, out of mind'. If readers have any more tips for Nick, he has asked that you ring him on 0268 (Rayleigh, Essex) 773136.

Harold Percivall on the other hand is an 'oldcomer', having been interested in amateur radio since 1922 when he had a 10 shilling 'Experimental Licence'. He made several crystal sets and a three valve battery set, before building a superhet in 1925. My older readers might have heard of Portadyne Radio, Aeonic Radio, Celebritone, Brownie Wireless, Ultra Electric — all establishments at which Harold was employed until the mid-thirties. After a hectic business life when short wave activities had to take a largely back seat, Harold chaired the Dynatron Radio dealers' committee from 1975-81. It was the vacuum caused by the end of this job which encouraged him back to short wave radio. In 1981, he remembers well hearing his best DX — a 5W1 — which fired him with much enthusiasm. He has only ever sent 176 QSL cards, all direct with accompanying letter and IRCs, and has an 81% success rate. Harold uses a Panasonic 49 receiver and a Hamgear ATU which has given considerable pleasure. The antenna is a simple inverted 'L'. He has many pen friends around the world and has had visits from HC1BP and CE4MT. SWLing has made retirement so much more interesting for Harold, who now sends monthly reports to Radio Japan and receives their excellent publication 'Radio Japan News'.

Listener reports

I return to this well-worn topic only because G4UZN wrote with some disturbing information about an SWL report he received — not from these shores, I'm pleased to say. He sent a copy of a QSL card he had received from a UP2 SWL. It gave G4UZN a 5x9 report on SSB for a QSO with KV4AD on 22 December 1987 on 24MHz. The problem? — G4UZN was using CW and received a 519 report from the KV4.

You will know that SSB was not permitted on that band at that time. Obviously, the SWL was just listening to the signal from KV4AD and sending cards out to the stations he was working irrespective of whether he heard them. The report is therefore a complete fraud. I'm sure I've said this before, but I'll say it again, before sending out reports, please LISTEN. If you hear a station working through a pile up at breakneck speed, do not send a card which simply reports on one 5 second QSO, provide details of as many QSOs as you can. Otherwise, be warned, you are unlikely to receive a card in return.

Cray Valley Contest

Despite fairly wide publicity, the Society was disappointed with the response to this Contest. There were no entries for the CW leg, and only five for the SSB leg. However, conditions were rather poor and might well have had something to do with the low turn out.

The SAC Contest coincided with the SWL events this year, and those who took part logged plenty of stations from that area. It appears that little or no DX was logged, and most entrants spent a lot of their time listening on 7MHz where many Scandinavians were taking part in their own event.

The Society were pleased to get one log from overseas — Mike Parent BRS88763/568 submitting one from Canada. Sarah Gregory BRS88709, who won the event by a handsome margin (by 79,000 points) is unknown to me and the HFCC and VHFCC, but judging from her log, is clearly one to watch in future events. In view of the small number of entries, the Society have only issued certificates to these two listeners.

RTTY Challenge

Although the challenge was as a result of an idea from Jean-Jacques Yerganian ONL-383, only one log was received. Grateful thanks are extended to Norman Henbrey BRS28198 who sent a log just to show that he was interested in listening to stations using RTTY as a means of making amateur contacts. He actually partook of three listener contests at the same time — my Challenge, the Cray Valley, and the ISWL! Using an FRG7700M and CWR-670E Telereader into a 132ft end-fed wire, he copied RTTY signals from UA9, VU and W.

Interbooks

This book firm, based in Scotland, have sent me their 1990 catalogue. It has very many titles, all aimed at the listener. Whether your interest is MW, LW, SW or VHF, you are bound to find something of interest. Why not drop them a line at Interbooks, 8 Abbot Street, Perth PH2 0EB, Scotland to get your free catalogue.

EMC MATTERS

HILARY CLAYTONSMITH, G4JKS
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If more SWLs had just sent a log to show they were interested in RTTY, the Challenge could have been a success. I shall include an RTTY Challenge in next year's calendar and will hope that a few more listeners take the trouble to support it.

HAB News

Dennis GW6JNE has provided the latest on the HAB scene. The WAB Committee was a little disappointed at the poor showing by SWLs in their 1989 contests (it seems to be a general malaise), and they hope for a better turn-out in 1990.

The Data Protection Act means that the information held on computer is kept to a minimum. This is why BRS numbers are not held on the computer and why I can only mention the names of the recipients of Awards. On the Area Award scheme, SWL Coker has obtained a Basic Award for 7MHz, while Chris Gibbs and G Ridgeway have both received their Silver Awards. SWL Wainwright now has his HF SSB Diamond, and Hedley Falkinder now has 3,400 areas heard on SSB. A Decade Award has been awarded to SWL Coker, who also now has a Class 2 Counties Award certificate. A new Award is for hearing 100 overseas bookholders, and SWL Sheppard has now increased his total to 100.

1990 sees the 21st Anniversary of HAB/WAB and it has been decided to try to raise sufficient money to give a guide dog to a blind amateur. If anyone can think of an amateur who would benefit, or who wishes to provide a donation they should write to either Dennis Sartin GW6 JNE at 7 Penrhos Crescent, Rumney, Cardiff CF3 8PB or Adrian Keeble G4HPU at 4 Manor Cottages, Saffron Walden. It might interest readers to know that WAB/HAB record books are now available in Braille, thanks to G0GPt. If anyone would like further details, please write direct to Dennis GW6JNE.

R F Byrne

Paul G6MEN who provides the R F Byrne cartoon series has advised that he is branching out. R F Byrne QSL cards are now available. Any one who requires more information about these cards should write to G6MEN at PO Box 32, Shrewsbury, SY1 1ZZ.

Finale

Yet another month where the level of correspondence has been high. This has led to some contributions having to be held over. That does not mean that you have to stop writing. I am always pleased to hear the news from any listener on whatever topic. So please let me have YOUR news which should reach me no later than 26 February if you want to catch the April issue.

Co-Ordinators Scheme

In December *RadCom* this new facility to members was launched. I would like to stress that the volunteer co-ordinators should only be contacted when the amateur has tried everything else. The content of the call should be EMC and not general society 'chat'. This is a service to members only. Members of the public should be advised to go through the correct channels ie, RIS for TV and Radio interference, British Telecom for problems with telephones. (This applies only when the phone was bought or rented from BT.)

Thinking about Models

If the word model makes you think of small aeroplanes or beautiful women then - like the vast majority of Amateurs - you are not a mathematician! It is probably true that the models of radiation are the least understood, or worse, the most mis-understood of all the technical aspects of Amateur Radio and are difficult to get the feel of, even though it is relatively easy to 'plug in' the numbers to standard formulae. A physicist would probably say that it is not surprising since a true understanding of radiation involves concepts which cannot be pictured in simple down-to-earth terms. From the Amateur's point of view it is better to have some picture, however crude, (providing it is not actually misleading), than to have no picture at all. Considering that radiation is what radio (not to mention EMC) is all about, it is worth repeating some illustrations which were used by a Committee member in answering questions at a recent Convention.

Screening

In the October 89 EMC Column, screening of plastic enclosures was mentioned. For a thin coating to achieve maximum shielding effectiveness to electromagnetic waves in the far field, the skin depth at radio frequencies needs to be as small as possible. This is achieved not by high conductivity alone, but by a combination of high conductivity and high permeability. Although the conductivity of nickel is less than that of copper, its higher permeability makes it a more effective shielding material in thin films.

A word of warning about the use of aerosol shielding sprays. Paint does not adhere well to certain plastic materials and if conductive paint flakes off there is a strong possibility of short circuits! Care is also required to ensure that the conductive paint does not cause a shock hazard by making contact with any 'live' connections including the chassis of a 'live chassis' TV receiver.

(a) Power Density (Watts/square metre)

Imagine an isotropic transmitting antenna in the centre of a large sphere, and that the sphere is made up of sheets of magic glass, each 1 metre square, and having the same electrical characteristics as space. It is easy to calculate the surface area of a sphere ($4\pi r^2$), so that if the radius were say, 282 metres, there would be a million one metre square sheets, and if the antenna radiated 100 watts, 100 microwatts would pass through each sheet and the power density would be 100 microwatts/square metre.

(b) Impedance of Free Space (377 ohms)

Now imagine that the magic glass sheets are replaced by sheets of conductive material - rather like the foam material that CMOS chips are kept in, but having a resistivity of exactly 377 ohms per metre square. This material will match to the radiated energy in the same way as the correct termination will match to a transmission line, and all the power will be absorbed, and nothing will be reflected. From the point of view of the transmitter this is exactly the same as if the energy had passed through the magic glass into infinite space, so that in effect the transmitting antenna 'sees' space as having an impedance of 377 ohms, in exactly the same way as an infinitely long transmission line appears to be correctly matched.

(c) Field Strength (Volts/metre)

Remove all the sheets but one, so that there is one 377 ohm square metre sheet left in a spherical surface which otherwise looks like free space, and assume this square to be aligned so that the edges are in the direction of the electric and magnetic fields. Imagine that it is possible to measure the EMF across the 377 ohm square from edge to edge, along the electrical field. This is the field strength. If this voltage is squared and divided by the resistance (377 ohms) we are back to the power density in watts/square metre.

(d) Capture Area

Replace the 377 ohm square by a dipole which is 1 metre long aligned along the electric field, and assume that the transmitter is operating at say, 20MHz so that the dipole is short compared to a half wave. Though the dipole is 1 metre long the EMF as measured at its centre, will be about half of what one might expect from the volts/metre of the the field strength. (One explanation for this is that each limb can be looked on as one plate of a capacitor with a mean location half way along the wire). Because no current flows, practically no energy is extracted from the field, but if the centre of the short dipole is connected to a matching circuit which tunes out the (capacitive) reactance and loads it with its 'radiation resistance' then energy will be drawn from the field over quite a large area. This is the capture area, and it is a remarkable fact that the amount of energy delivered to the load by a dipole of less than a half wave long is independent of the length of the dipole provided that the matching is lossless. In effect tuning a short wire to resonance causes it to reach out and pull in energy from the field and deliver it to the load. This leads to the well known trade-off between short antennas and bandwidth.

EMC and Satellite Television

With the growth in domestic satellite receiving equipment, we have yet another potential source of interference to Amateur Radio receiving systems as well as another type of receiver to be susceptible to amateur transmissions.

A typical satellite receiving system consists of two additional units and an antenna, placed before the video unit or television. These units are a Low Noise Converter (or Block Downconverter), and a TV Decoder.

The Low Noise Converter (LNC) amplifies the satellite down-signal and converts to an IF between the ranges 950-1750MHz. This frequency change is to overcome the losses associated with cables if the fundamental frequency of 11-22GHz was used directly to the decoder.

As you can see, the 23/24cm band falls within the IF range and operators using the band can expect potential problems on both transmit and, to a lesser extent perhaps, on receive.

On start-up of the satellite TV service, the operators of the service were warned that there would be no protection offered by the DTI, which applies equally to the Amateur services too.

EMC problems have already been reported on 2 metres to amateur receivers. If you are suffering from problems, please write to me so that we can assess the overall problem within the UK. When you write, please identify the manufacturer of the satellite system affected as this will provide the EMC Committee with information which can then be taken up with the manufacturers concerned.

'The RIS and the Radio Amateur'

Thank you to all the people who have responded to the article written by the RIS for the column in the December *RadCom*. If you haven't commented yet please do so to me at the column.

CONTEST NEWS

RULES

FIRST 28MHZ CUMULATIVES 1990 RULES

The format for this event is unchanged from the second 28MHz Cumulatives 1989.

1) Entrants: Single-operator, UK stations only. If desired, entrants may operate from a 'portable' location, but this must be the same for all sessions. All entrants must be members of RSGB.

2) Dates & Times (GMT):

Session 1, Monday 9 April. CW 1900-2000, SSB 2030-2130

Session 2, Tuesday 17 April. SSB 1900-2000, CW 2030-2130

Session 3, Wednesday 25 April CW 1900-2000, SSB 2030-2130

Session 4, Thursday 3 May. SSB 1900-2000, CW 2030-2130

Session 5, Friday 11 May. CW 1900-2000, SSB 2030-2130

3) Frequencies: CW 28.0 - 28.1 MHz, SSB 28.5 - 28.6MHz

4) Sections: (a) CW, (b) SSB, (c) Combined.

5) Exchange: RS(T), serial number beginning with 001 on each evening (running continuously through both modes if appropriate) and County Code as published in *RadCom* or the RSGB *Call Book*. Entrants may work stations worldwide, and the same station may be contacted for points once on each mode on the same evening. Each day is treated as a separate event.

6) Scoring: Three points for each completed contact, plus a bonus of ten points for each new county and each new country (outside the UK) worked. Where a county or country is worked on both CW and SSB on the same evening, the bonus may be claimed twice. Duplicate contacts for which points have been claimed (except as permitted in 5) will be penalized at ten times the score claimed. Entrants for the CW and/or SSB sections should submit logs for the THREE best sessions out of the five on that mode, and for the Combined section should submit logs for the THREE best evenings out of the five. A contestant may enter any one, any two, or even all three sections if desired. Entrants' logs for sessions other than those constituting the entry would be most welcome as checklogs.

7) Logs: Logs should be typed or clearly written on (ideally) RSGB HF contest log sheets (HFC1), or prepared to the same format, with columns headed: Time, Callsign of station worked, RST/Serial sent, RST/Serial received, Bonus (if claimed), and Points claimed, and with 40 QSOs per page on A4 paper. Computer-printed logs on normal-width fan-fold paper are perfectly acceptable if formatted as above. Both modes for the same evening may go on the same log, following on without a gap. A callsign checklist ('dupe sheet') is not required for this event, although a list of bonuses claimed for each mode/session would be useful. Each entry should be accompanied by a cover-sheet (HFC2) bearing the usual signed declaration. One cover sheet will serve for each entry, regardless of the number of sessions. Copies of these forms are available from RSGB headquarters, or may be photocopied from publications, eg Call Book.

8) Entries: Entries must be postmarked not later than Tuesday 29 May 1990, and sent to HF Contests Committee c/o David Hill G4IOM, 14 The Garrones, Worth, CRAWLEY, West Sussex, RH10 4YT.

9) Data Protection Act. Entrants should note that the adjudicator may enter information from their logs into a computer for the purpose of checking or preparing tabulations. Entrants objecting to this must clearly state their objections on the cover sheet.

10) Awards: Certificates of merit will be awarded to the entrant in each section with the highest checked score. Further awards may be made at the discretion of the HF Contests Committee if the entry for any section exceeds 20.

LOW POWER CONTEST 1990 RULES

Due to lack of support in the past, and also to encourage real QRP participation, the 10W limit section has been discontinued, and an extra certificate is offered to the leading QRPp station (QRPp = 1 Watt or less, and comments from competitors are welcome!) This event is open to UK stations only - logs from overseas stations participating will be accepted and listed, but will not be eligible for awards.

1. Rules. The general rules for RSGB HF contests (as published in *RadCom*) will apply.

2. Date and Time. 0700-1100GMT, Sunday 15 April, 1990.

3. Entrants. UK stations only. Entrants must be members of RSGB.

4. Frequencies, mode and power. 3.510-3.560MHz and 7.010-7.040MHz, CW only. Maximum power: 3W RF output.

5. Exchange. RST + serial number (commencing at 001) + output power eg: 559001 3W

6. Scoring. Entrants may work stations both in the UK and overseas. Score fifteen points for each completed contact with another QRP station and five points for all other contacts. The same station may be worked for points on both bands.

7. Documentation. Separate logs are required for each band. Logs should be submitted on standard RSGB log sheets, or on A4 size paper (computer fan-fold is acceptable) with columns headed Time(GMT), Callsign worked, RST/serial sent, RST/serial/power received, Points claimed, and with forty QSOs per page. Each entry must be accompanied by a properly completed cover sheet (form HFC2) or a standard RSGB declaration signed by the entrant.

8. Equipment. The transmitter or final power amplifier stage shall not be capable of RF output power in excess of 15 Watts. A description of the method of power reduction to comply with the contest rules, and of the equipment used to measure power MUST accompany each entry.

9. Address for entries. Logs should be sent to: RSGB HF Contests Committee, c/o Mrs H Claytonsmith G4JKS, 115 Marshalswick Lane, St Albans, HERTS, AL1 4UU.

10. Closing date for entries. Logs must be postmarked not later than 15 days after the end of the contest.

11. Awards. The 1930 Committee Cup will be presented to the winner. Certificates of merit will be awarded to the second- and third-placed stations, and also to the highest-placed entrant using completely 'home-brew' equipment. A further certificate will be awarded to the highest-placed entrant using 1 Watt (or less) RF output power.

HF NFD 1990 RULES

Field Day is an established highlight of the UK and European contest scene. It provides a fun weekend for all level of operators with the added attraction of a competitive element. If your local club hasn't taken part recently, why not organise an entry this year?

New style log sheets with spacing suitable for computerised print-out will be available. One copy of all stationery will be sent to all groups registering - photo-copies should be arranged as required.

One possible modification to the rules might be to include a multiplier system in the Open section and make the scoring similar to SSB Field Day. This would give the Open section entrants added incentive to look for DX contacts and therefore widen the potential scoring gap between the two sections. Please add your comments on this to your notification details and/or final entry.

1. Site notification. Each group intending to compete must send details of the site to be used to: RSGB HF Contests Committee, c/o J C Burbanks G3SJJ, 'Southlands', 16 Colgrave Road, Plumtree, Nottingham NG12 5NX, to arrive no later than Saturday 28 April 1990. Details must include the name and address of the person responsible for the entry and to whom contest stationery should be sent, section to be entered; name of group; callsign(s) to be used; national grid reference and sufficient access information for an inspector to be able to locate the site.

2. Date and time. From 1500GMT Saturday 2nd June to 1500GMT Sunday 3rd June 1990.

3. Sections.

(a) Open Section. One transmitter and one receiver (or one transceiver). There is no restriction on the number or type of antennas, but the maximum height must not exceed 65ft. (20m).

(b) Restricted Section. One transmitter and one receiver (or one transceiver) with one antenna which must be a single element such as a dipole, vertical, end fed wire etc, having not more than two elevated supports and not exceeding 35ft (10.7m) above ground at its highest point.

Notes. (i) Stand-by equipment is allowed, but it may not be connected to the power source when the main equipment is in use.

(ii) It is not permitted to use permanent buildings or structures as support points for antennas: trees are an exception to this.

(iii) Each portable station must operate from the same site for the duration of the contest and may not be located in permanent buildings or use the public mains supply.

(iv) power for all equipment may only be derived from a portable generator on the site, or from solar cells, accumulators or batteries. Float charging must only be from a portable generator.

(v) No equipment or antennas may be installed or erected on the site prior to 24 hours before the start of the contest. This does not apply to storage of equipment.

(vi) All stations are subject to inspection by representatives of the HF Contests Committee. The inspector's brief will be to ensure that the rules and spirit of the contest are being observed. Should the inspector be unable to locate the site due to inadequate or incorrect information, the entry will be disallowed. In the event of a late change of site, it is the responsibility of the members of the group to make suitable arrangements for the inspector to find the new site. The inspector must be given immediate access to all parts of the site with the right to stay as long as desired, and the ability to return at any time during the contest. The inspector may also visit in the 24 hours before the start of the contest. The presence on site of any amplifier or modified commercial equipment capable of excess power will result in the entry being disallowed, and in the event of such an infringement being proven, all operators listed as being associated with the group in operating the station will be barred from entering any RSGB contest by the HF Contests Committee for five years.

4. Frequencies and mode. CW (A1A) only in the 1.8, 3.5, 7, 14, 21 and 28MHz bands. Contest preferred segments as recommended by the IARU should be used ie 3510-3560 and 14010-14070KHz.

5. Exchange. RST and serial number starting from 001.

6. Scoring. Each station may be worked once on each band, but points must not be claimed for contacts made by a competing station with members of its own group. Points will be scored as follows:

Fixed stations in Europe including the UK: 2 points

Fixed stations outside Europe: 3 points

Portable or Mobile stations in Europe including the UK: 4 points

Portable and mobile stations outside Europe: 6 points.

The contacts on 1.8MHz and 28MHz should be scored as above and the totals multiplied by two to obtain the band score for the RSGB listing. An IARU Region 1 listing will be collated by the Region 1 contest manager, and the totals in this list will not include the above factor.

7. Documentation. Contest stationery will be sent in May to the person making the notification under rule 2. Separate logs must be used for each band with a summary sheet, form HFC2, and band cover sheet being included with the entry. Duplicate contacts must be marked as such without any claim points. Unmarked duplicates for which points have been claimed will be penalised at the rate of 10 times the number of points claimed plus the claimed score and logs containing in excess of five, regardless of band, may be disqualified.

8. Name and address for entries. Address logs to 'HF Contests Committee' as follows: British Isles entrants to J.C.Burbanks, G3SJJ, 'Southlands', 16 Colgrave Road, Plumtree, Nottingham NG12 5NX. Overseas check logs should be sent to PO Box 73, Lichfield, Staffs. WS13 6UJ, England.

9. Closing date for entries. Logs must be post marked no later than Monday 18th June 1990.

10. Trophies.

(a) The National Field Day Trophy to the station having the highest checked score, regardless of section.

(b) The Bristol Trophy to the station having the highest checked score in the other section.

(c) The Gravesend Trophy to the runner-up in the section having the highest number of entries.

(d) The G6ZR Memorial Trophy to the runner-up in the other section.

(e) Certificates of merit to the stations having the three highest checked scores in each section.

(f) The Scottish Trophy to the Scottish station having the highest checked score.

(g) The Frank Hoosen G3YF Trophy to the station having the highest checked score on the 14MHz band.

(h) Certificates of merit to the groups in each section with the highest checked scores on each band.

11. Check logs. While overseas stations are not eligible to enter NFD, checklogs are very welcome. A certificate will be awarded to the overseas station in each continent whose checklog shows the most points contributed to competitors.

12. Data Protection Act. Entrants should note that the contest adjudicator may enter information from their logs into a microcomputer for the sole purpose of checking for duplicate contacts and preparing tabulations. If any entrant objects to this they must clearly state their objections on the summary sheet.

HF CONTESTS CHAMPIONSHIP 1990 RULES

1. Any General Rules for RSGB contests do not apply.

2. No entries for the Championship are required.

3. The Championship will be decided on the basis of RSGB HF single-operator contests held between 1 January 1990 and 31 December 1990.

4. Every UK station entering for 2 or more of the events listed below will be awarded points, calculated as in the example shown.
(a) The entrant's score will be expressed as a percentage of the score achieved by the leading UK station in that contest.
(b) The points calculated in (a) will be multiplied by the appropriate factor for the contest:
LF Phone: 20; 1st & 2nd 1.8MHz: 10; 7MHz CW: 20; Commonwealth: 30; ROPOCO 1 & 2: 10; County Roundup (Phone & CW): 10; 21/28MHz Phone: 30; 21MHz CW: 30
Example: If the leading station in the 21MHz CW Contest scores 30,000 points, and the entrant concerned gains 6,000, then the Championship points awarded for the competitor for this event will be:
(6000x100x30)/30,000=600
5. Awards: The G2QT Trophy will be awarded to the winner, and the runner-up will receive a certificate of merit. *G3OZF*

RULE 16

The FINAL wording for Rule 16 is as follows:

The DTI licence limits must be strictly adhered to.

In an RSGB contest (sponsored or controlled by VHFCC) where the contest power limit is lower than the DTI licence limit than this limit, (as described in the rules for the contest in question) must also be strictly adhered to.

If upon inspection a station is found to be running ILLEGAL power, or above the contest power limit, the station will be DISQUALIFIED, ALL operators of that station during the contest in question will be liable to a BAN on entering ALL VHFCC sponsored or controlled contests for a period of up to TWO years.

As agreed by VHFCC, G4DEZ Chairman.

It is not a question of turning a 'blind eye' to people running high power amplifiers; the stations who are capable of running ILLEGAL power are known and they will be inspected.

Please do not try to claim low power output when in fact you have one of two hundred watts or more. What possible satisfaction do you get in 'winning or doing well' you have been CHEATING not only the other contestants but yourselves as well.

I wonder how many UK to foreign parts FIRST QSOs would take place on 6m if 'rule 16' were rigidly applied to DXing. You will notice that for 1990 6m contests are drastically reduced because there seems to be no way that the VHFCC can ensure fair play on the band. *G4DEZ*

RESULTS

HF CONTESTS CHAMPIONSHIP 1988/9 RESULTS

Position	Callsign	Score	No. of Events
1	G4OBK	9,246	6
2	G3FXB	7,340	4
3	G4BUO	6,572	4
4	G3LET	6,567	5
5	G3TBK	4,704	5
6	G3MXJ	4,316	2
7	GW3YDX	4,000	2
8	G2QT	3,653	4
9	G4CNY	3,511	2
10	GW4ROI	3,384	3
11	G5MY	3,297	4
12	G3NOM	2,900	2
13	G4WQN	2,747	2
14	G3SWH	2,707	4
15	G4ODV	2,818	3
16	G3RTC	2,333	2
17	G3VYI	2,276	4
18	G3NKC	2,175	6
19	G3NKS	2,022	4
20	GW3HGJ	1,928	2
21	G4WYG	1,856	2
22	G3GLL	1,758	2
23	G3SOX	1,725	3
24	G3ESF	1,616	3
25	G3PDL	1,598	2
26	G3SJJ	1,533	2
27	G2HLU	1,521	2
28	G3OLU	1,500	2
29	GW2OB	1,468	3
30	GM4SID	1,467	3
31	G4KGK	1,414	3
32	G3HTD	1,306	2
33	G3ZGC	1,259	2
34	G3MCX	1,225	3
35	G3AWR	1,212	3
36	G3SJX	1,201	2
37	G3RXP	1,186	2
38	G3MPB	1,174	2
39	G2MJ	1,158	2
40	G3WRR	1,094	4
41	G4IOM	1,090	3
42	G3YLC	1,073	2
43	G3FSR	929	2
44	G4EBK	915	3
45	GM3UM	913	2
46	G4UZN	886	2
47	G3BPM	839	2
48	G3LIK	783	2
49	G0CGB	679	2
50	G3FVW	659	2
51	G3SKC	658	2
52	G3RKO	656	2
53	G0EKO	655	2
54	G3XTT	611	2
55	G3DPX	609	2
56	G3ZRZ	573	2
57	G3GMS	522	2
58	GW3SB	387	2
59	G4FDC	261	2
60	G6QQ	209	2

The G2QT trophy is awarded to G4OBK.
Runner-up certificate to G3FXB *G3OZF*

CONTESTS CALENDAR

RSGB HF CONTESTS

1 Feb	1.8MHz LF Cumulative (Nov89)
3 Feb	7MHz LF Cumulative (Nov89)
4 Feb	3.5MHz LF Cumulative (Nov89)
9 Feb	1.8MHz LF Cumulative (Nov89)
10 Feb	1st 1.8MHz Contest (Nov89)
24 Feb	7MHz CW Contest (Aug89)
24,25 Mar	1.8MHz SSB (Jan90)
1 Apr	Ropoco 1 (Jan90)
9 Apr	1st 28MHz Cumulative (Feb90)
15 Apr	Low Power Contest (Feb90)
17 Apr	1st 28MHz Cumulative (Feb90)
25 Apr	1st 28MHz Cumulative (Feb90)
3 May	1st 28MHz Cumulative (Feb90)
11 May	1st 28MHz Cumulative (Feb90)
2,3 June	HF National Field Day (Feb90)

RSGB VHF CONTESTS

4 Feb	432MHz Fixed/AFS/SWL (Jan90)
11 Feb	70MHz Cumulatives
25 Feb	70MHz Cumulatives
3,4 Mar	144/432MHz (Jan90)
11 Mar	70MHz Cumulatives
25 Mar	70MHz Cumulative/Fixed/SWL
8 Apr	50MHz Trophy Fixed/Single/Multi
5,6 May	432MHz Trophy & SWL
5,6 May	434MHz to 24GHz
19,20 May	144MHz & SWL Single/All others
10 Jun	432MHz CW Single/Multi
10 Jun	432MHz FM Fixed & Open
7,8 Jul	VHF Field Day
28 Jul	144MHz Low Power/SWL
29 Jul	432MHz Low Power/SWL
All Aug	432MHz Activity
12 Aug	1·3 & 2·3GHz Trophies
All Sep	1296MHz Activity
1,2 Sep	144MHz Trophy/SWL
16 Sep	70MHz Trophy/SWL
30 Sep	50MHz CW
6,7 Oct	432MHz - 24GHz SWL & IARU
9 Oct	1·3 & 2·3GHz Cumulatives
17 Oct	432MHz Cumulatives
21 Oct	70MHz CW
25 Oct	1·3 & 2·3GHz Cumulatives
2 Nov	432MHz Cumulatives
3,4 Nov	432MHz CW 8-hr Marconi/RSGB
10 Nov	1·3 & 2·3GHz Cumulatives
2 Dec	144MHz AFS/Fixed/SWL
4 Dec	432MHz Cumulatives

There will be an SWL section in every VHF contest even if not mentioned in rules

OTHER CONTESTS

First Tuesday each month
144MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
First Thursday each month
432MHz Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)
First Monday each month
Microwave Scandinavian VHF/UHF/SHF Activity Contest (Jan89 VHF/UHF)

Dates of publication of rules in *RadCom* are shown in parentheses

Q. What do **four Radio Amateurs, a sub-tropical island** 600 miles East of North Carolina, and the **weekend of March 17th & 18th 1990** have in common?

A. Four* Radio Amateurs will win engraved trophies in the prestigious 1990 Bermuda Contest to be held that weekend. (They will also be provided with round-trip air transportation and accommodation to receive them in beautiful Bermuda in October 1990. See Offical Rules for details. See atlas to find sub-tropical Bermuda!)

* One winner each from the United States of America, Canada, The United Kingdom and West Germany. 1989 winners who visited Bermuda in October '89 were N3NT, VE3XN, G4OSY DK8FD.

Bermuda Contest 1990

For the 1990 Bermuda contest rules see *QST Contest Corral*, January 1990 *RadCom* or send an SAE or label and 2 IRCs to The Contest Manager at ...

The Radio Society of Bermuda, P.O. Box HM 275, Hamilton HM AX, Bermuda.

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PYE F30 BASE TX + RX low band AM, 70-90MHz, choice of 3. £25 EACH • £10 P+P
PYE F30 DM1 TX + RX 420-470MHz, choice of 69. £25 EACH • £10 P+P
PYE F30 UHF, 420-470MHz, choice of 12 £20 EACH • £10 P+P
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PYE PYE FM hand held high band FM, choice of 5, C/W Batts £20 • £3 P+P
PYE PF2 FM low band FM, choice 3 £20 EACH • £3 P+P
PYE PF3 UHF, 440-466 MHz, choice 7 £20 EACH • £3 P+P
STORNO 600 (612 ex earphones), high band FM, 159-165MHz £10 EACH • £3 P+P
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ITT SET6 high band FM £15 EACH • £3 P+P
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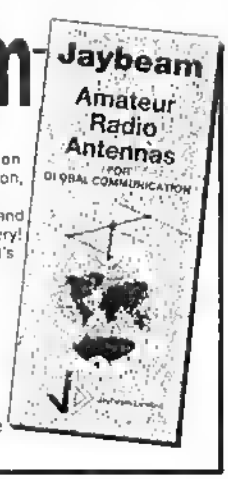

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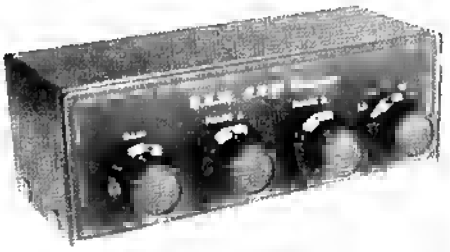

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COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCSE, Career and Professional examinations etc) write or phone — The Rapid Results College, Dept JT17, Tuition House, London SW19 4DS. Tel 01-947 7272 (9am-5pm) or use our 24hr Recordacall service 01-946 1102 quoting JT17.

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CONVERSION SERVICE to amateur frequencies of Pye, TT, Burndept, etc. P.M.R. equipment. Typical charge £30 plus crystals. G4FSO, 65 Longfield Avenue, Golcar, Huddersfield, W. Yorks, HD7 4BT. (0484) 644827.

ELECTRONICS WORKSHOP Repairs, rebuilds, modifications, advice. Specialists in valve equipment. See also PAYL School, Green G1NAK Chytean, Tintagel, Cornwall. 0840 212262.

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FOR SALE

● YAESU FT101B, FV101, SP101, CW filter, DBM RX, spare 6JS6Cs, 12BY A7, service manual: £375. Matching Europa Ivtrs, 70MHz: £40. 144MHz: £50. With spare QQVO6-40As or complete £450. Telequipment D33 double-beam Serviscope: £40. Jaybeam 70MHz 4ele: £10. Tonna 144MHz 9ele £10. G3OHC QTHR. (York) 0904 87779

● KENWOOD TM221ES compact 45W 2m rig, as new cond. £240. Could deliver North or East England. Frank, G0JKG QTHR. 0742 588415

● TS430S inc FM unit, YK88C 500Hz CW filter, YK88SN 1.8kHz SSB filter, MC43S hand mic, MC50 baseslation mic, SP430 spkr. All absolutely mint cond. Orig boxes, insts and accs. Supplied by Lowes: £725. No offers please or splits. AT230 covers 9 bands 1.8-29.7MHz through-line wattmeter/swr meter. Boxed, insts, accs. Mint cond. £150. BNOS 6m linear LP50-10-50 mint, boxed, insts, guarantee £100. G2FZU QTHR. (Southwell, Notts) 0636 813847

● YAESU SB10 and YH1 PTT switch and headset to fit FT290 Mk2, FT211 etc: £25. Lightweight VHF rotator, VGC £25. Kenwood TK701S VHF PMR with DC cable and mic. VGC convert 6 or 2m? Offers. Paul, G0KPH QTHR. 0926 429719 anytime

● TRIO TS820 HF tcvr, CW filter fitted plus VFO520 and manuals. Exc cond. £400. G0DZU QTHR. (Romsey) 0794 884286

● COLLINS KWM2 HF tcvr 3.5-28mcs with 399C1 VFO and spkr fitted. Collins noise blanker 136B2 c/w Shure mic 444. GWO. £450. G3BXI QTHR. (Southwick, Wilts) 0373 830804

● FT225RD with Mutek F/E £490. RA17 £120. 19m cat-pol £20. Numerous items. Creed rtg 444 7B with cover, controlands, tapereader etc. All fine, probably suit newly formed club. QTHR. (Wellington) 0734 781782

● TRIO JR500S double conversion amateur bands RX with matching SP5D spkr. Revalved, h'book. Both boxed £50. Virtually unmarked. G4IYB QTHR. (Esher, Surrey) 01-398 5050

● SCANNER Realistic PRO2004 25-520MHz; 760-1300MHz, 300mem etc. Complete, boxed, as new £260. Superior discone ant 25-1300MHz £40. G1GOL QTHR. (Hampshire) 0425 54946

● TS940S built-in auto tuner 250Hz CW filter. Magnificent specimen. £1600. Tony, G0HTX not QTHR. (London) 01-727 2246

● DRAKE T4XC, AC4, MC, 2x filters MS4, MN2000. All one owner. Superb cond. £750. No splits. Tony, G0HTX not QTHR. (London) 01-727 2246

● SILENT key sale. Xtals, 100kHz, 3.5MHz, 7MHz, 8MHz. Valves 713A, 717A, 6SG7M. G4QK QTHR. (Bridgwater) 0278 424508

● SP102 £40 or exch for SP901 or SP901P. Hi-mount twin paddle MK705 on marble base: £15 plus post. G2TXS QTHR. (Tyneside) 091-257 2852

● QTH 3 bed detached bungalow in the popular village of Bovingdon, Herts. M25 6 miles, M1 7 miles. 1/5th acre site. 90ft drive to large garage. Front, side and rear gdns. 133ft long wire ant and 2m colinear ant. 500ft ASL. 3 dble beds. Large loft, with walk into door. Large kitchen, utility room, dining area, lounge and large sun lounge. Bathroom, separate WC. Fully double-glazed by Everest. Electric storage heaters. Several trees in well laid-out, secluded, back gdn. Large back shed with pwr and water. Make good shack. Vacant possession from March 1st 1990. Further details by phone QTRO. £165,000. G3VOZ QTHR. (Hemel Hempstead) 0442 833300

● KENWOOD TR851E. First cash offer over £385 gets it. Mint cond, orig packing. No wheeler dealers! Yaesu HF module for FT726R, in orig packing, tested only: £250 cash. Also various items of top grade audio equip, and photographic gear. G3GYX QTHR. (Nottingham) 0602 396387

● 6M RN electronic tvtr 2m IF 25W out £110. Interested in DX TV. Yoko VHF/UHF band I/3 £25. IC202S SSB trans £110. All items ono. Carr. extra (Wakefield) 0924 823866

● AUSTIN Champ Rolls Royce engined mobile HF station with R210/C11, B47, trailer. Ready for display £4000. Would swap. G4XWD QTHR. (Kidderminster) 0562 823674

● YAESU FT7B mobile HF rig, 50W out c/w YC7B digital display. Perfect cond, orig packing, manuals £385. FC707 ATU, boxed, manual: £80ono. Carr. extra. Dick, GW0IQP QTHR. (Newtown) 0686 626551

● KENWOOD TS770E VHF/UHF multimode basestation tcvr. Exc cond. £450ono. Paul, G4DKB QTHR. (Billericay) 0277 653561

● YAESU FT209R 2m h/hold, chrgr, spkr, mic, PA3 adtr, soft case. boxed. £180. G0JCM. (Strome) 047482 3797

● PYE W15FM 70.45, 70.26 with manual. £20. Homebrew 70cm tcvr xtals for 5 repeater 2 Simplex channels: £35. G4BWW QTHR. (Southport) 0704 29036

● TS430S, PS430, £600. IC275E, £600. TM211E mobile: £175. PK232 with s/ware £200. MFJ949C Versatuner: £100. All items mint, boxed. Also Star SD10 dot matrix printer, boxed: £150. Panasonic MC6 video camera c/w case, accs, spare tapes: £600. G4ODK (Ilminster) 0460 57684

● YAESU FT101ZD tcvr VGC: £450. Datong morse keyboard, model MK. Good cond. £50ono. Jim, G4UYQ QTHR. (Cirencester) 0285 655253

● YAESU FT757GX, MH1B8 scanning mic £590ono. Yaesu FC707 ATU similar FC700: £68. FP757GX PSU £48. WANTED FT101, TS530, TS820 or sim, also Versatower ATU, 2m hand portable VHF scanner RX. 0843 63068 or 294446

● BUTTERNUT HF6VHF ant, with STR II radial kit. Perfect cond, mth old. £198 new. Carr extra. £140. Peter. (Exeter) 0392 432675

● STANDARD 2m h/held 2W. With h'book. £25. TV-DX ext. De-Lux D100 £65. (Leicester) 0533 696796

● EDDYSTONE S640 gen cov comm RX. 1.6-30MHz, S meter, spkr, manual, good cond. £35. Prefer test collect or plus carr. Spare set new valves £5. G3AEP QTHR. (Blackpool) 0253 720756

● ICOM2E, 2 nearly new BP3 nicad packs, chgr, car lead. £120. Be safe operating mobile! Trio goose-neck mic and control box for RJ201 etc: £15. Modems with h/books, orig packing. Prism 2000 Demon with Beeb ROM £25ea. G4LWA QTHR. (High Wycombe) 0494 31755

● TEN TEC Argosy II 525D fitted 1.8kHz filter and noise blanker. Mint cond £550. PSU £85. Bases tation mic £50. Yaesu FT101 Mk2 fitted G3LLL clipper and double balanced mixer. Recent service by G3LLL. £390. G4WGL QTHR. (Appleby, Cambria) 07683 51994

● YAESU FT747GX AM FM board, CW filter, immac cond, phones, swr meter £490. Carr paid. Yaesu FRG9600 SMC extended to 950MHz, immac cond £350. D707 active ant as new £75. Covers 500kHz-1500MHz. Carr inc. BNOS PSU 25A £95. John G4YDM. (Washington) 091-416 2606

● YAESU FRG7700 comm rcvr, suitable for spares, together with Yaesu FRT7700 and FRV7700. Offers. (Plymouth) 0752 224905

● VHS C portable VCR, little used £110. 14in hi-res colour CRT new £15. A47-14W CRT new £4. Four tested 30mm Plumbicons and yoke £5. 20 camera lenses 1in to 6in focal lengths, various formats. SAE for list. £1 to £6. 5V 20A, 15V or 12V 1.75A twice mains power supply: £8. All plus post at cost. G3RBM QTHR. (Bury St Edmunds) 0284 754318

● COMPLETE station. Going QRT. Trio 700G, Swan 350 ATU, ants, feeds etc. Details from Stan. (Notts) 0773 605004

● BRISTOL NW District. Secluded 1936 SD residence. 300ft ASL. 3 bed. 2 lounge, kitchen diner. Bath, separate WCs. Studio over garage. 60ft garden. Planning permission for 40ft tower. Good takeoff. Easy access to city and country. £127,500ono. G8MHD QTHR. (Bristol) 0272 247028

● DECCA Voyager Marine tcvr c/w inst manual, ideal for conversion to 80-160m, as purchased from SNC £50. Mains PSU for Eddystone rcvr 12V output £18. Bird Thruline module, 25-60MHz 25W £25 or exch for module for VHF marine band. Yaesu FT901DM c/w mic and inst manual £430. G4HYO, 14 Spring Meadow, Holly Spring Lane, Bracknell, Berks. 0344 483696

● CTE1600 2m h/held. £85. DTR3 80m CW plus TO2 ATU and swr £140. Roland S10 sampling keyboard £490. Canon T50 SLR £70. All ono. Jon Jenkins G4LJW. (Bristol) 0272 634167

● REDIFON R145 RX 2-30megs. AF filter 1KC LP and out. RF and AF controls. AGC off short long. BFO. AE trimmer. Selectivity 300CS 1KC 6KCS 12KCS. Noise limiter. USB LSB. Xtal cal. Dial to 3 places 80:1 drive. Valves check and S-meter. E-Series Mullard valves. Built-in PSU. Output 3ohms and 2 pairs phones. Input 75ohms coax. Manual SSB needs attn. Suggest arrange visit to operate and inspect. Will accept reasonable offer over £50. (St Asaph, Rhyl) 0745 583723

● FT780R Yaesu 70cm multimode 10W out. Mint cond, orig packing. 12XY Jaybeam, as new. Start haggling at £270 the lot. May take cheap FM box in pt-exch. G8WRV QTHR. 0480 217756

● FULLY galvanised 3 section tower c/w brackets, cables, etc. Height 79ft. Going cheap. 0504 265675

● VALVES QQVO6-40A £25. QQVO3-20A £15. Brand new, boxed. QQVO3-10, £10. BC221 £20. HF linear h/brew, £100. G3NOH QTHR. 01-997 4756

● KW2000B HF 10-80m with PSU and spkr. GWO. £225. Or pt/exch for mobile base HF. (Sleaford) 0529 302839

● AR2002 scanning rcvr and DI 30N discone ant both 25-1300MHz. 6mths old: £398. Park Air Electronics 360ch aircraft band monitor. Mains or batt £78. AR240 2m 800ch h/held covers UK and USA bands £95. All above in mint cond. 4x high pwr 300ohms dummy load resistors, 14in long, 1in dia: £5ea. Grundig video 2000 2x4 Super. PSU module fault £20. Telefunken 26in TV 743GB. Intermittent PSU fault. Superb when it decides to work: £25. Large selection popular 6V and 12V octal valves, metal and glass types. Pye Vanguard AM radio-telephone £15. G3WIF QTHR. (Bristol) 0272 293738

● SPECTRUM 128k, microdrives, remote control, Genie interface, mult fuze extras: £150. Interlaker £75. Scarab TV s/ware £30. Kenwood 28-144 tvtr. £50. New axial fan 240V/205CFM £10. Microdot dedicated CW RTTY terminal, cost new over £600. Bargain £200ono. Solid state 2-30MHz variable input amp 100W £75. Other bits, rotator 35ft Racal telescopic mast WHY. Exch or pt/exch. G4REZ QTHR. (Reading) 0734 311852

● BUTTERNUT HF5B compact 2ele beam, 6mths old. superior to minibeams. £180. G0JFU QTHR. (Gloucester) 0452 862773

● LINEAR KW1000 little used since new £275. Valves, c2000 mostly boxed. Offers. GM4AXS QTHR. (Oban) 0631 65147

● MACINTOSH 1meg RAM £35. R107 works: £25. Norris Clarke REU300C and R1302B £230. Big toroid gives 33V 15A when rectified £15. 4CX10000D, ten thousand £250. QY4 400, £50pr. VVIL80FT £20ea. G8JFJ QTHR. (Horndean) 0705 596836

● WIRELESS set 46, appears OK, and complete. Various parts from both wireless sets 62 Mk2. Also damaged Jefferson Travis ultra shortwave tcvr VFI, and Philco BCF2 rcvr, both of these rather tatty. Old car? radio contains 4 octal valves and Plessey synchronous vibrator 6V. Lastly, Leak Trough Line 3 stereo valve FM tuner. Good cond with circuit etc. Some of above might interest collectors or do for parts. I just need the space! Any offers/enquiries. Chris. (Reigate) 0737 222712

● ICOM 735, mint cond. £730. SEM Transmatch with built in Ezitune £65. G0CTC QTHR. 07048 76469

● BNOS 6m amp LP50-10-50. Perfect. £99. (Basildon) 0268 584564

● PYE Westminster W15U bootmount, choice of 2, mic. one with RB2, RB11, RB8(RX) £60. Another, RB0, RB2, RB4, RB6, RB10, RB11, RB13, RB14, SU20, RB8(RX), preamp £80. NM144/25 £35. 7/8 wave mobile ant. G6YYF QTHR. (Aylesbury, Bucks) 0296 28103

● COMPLETE HF station. FT707, FP707, FC707. VGC. Going VHF only. £550ono. G3TXK QTHR. (Leeds) 0532 873628 eve

● EDDYSTONE EA12 £125. Eddystone 940, sick £25. PK232 as new £200. Also BBC-B with 232 s/ware on Eprom £125. SC1500 printer £100. ST6TU £10. Cross timing indicator £10. Buyer collects. (Lincoln) 0400 73268

● CAPCO 80-40m magnetic loop ant. Buyer collects. No time wasters. £320ono. G4INP QTHR. (Suffolk) 0728 832446

● 1154 1155, big HT/LT PSUs. H'book. Unknown operational cond. Offers. G4WJX. (Stoke-on-Trent) 0782 330613

● FISCHER 2m linear £300. Fischer 70cm linear £275. Both 300W plus PEP. G5HD. 0409 28342

● VALVE HF TX Hallicrafters HT37 80-10. GWO and cond. £120. Also Yaesu FRG7 VGC £110. Buyer collects or pays carr. G4AIH. (Sale, Cheshire) 061-962 1904

● FT101ZD 9 bands. Inc. CW filter, FM, DC pack, FV101Z ext VFO. FC902 ATU. No splits. £550. (Cumbernauld) 0236 723436

● FT101Z with fan, CW filter, mic, manuals, perfect cond. £350. Also FV101DM digital mem VFO. Perfect cond with manual £100. G4EJW QTHR. (Burnham on Sea) 0278 784734

● YAESU FT221R 2m multimode basestation. Mutek F/E 15W 144-148 coverage, with mic. 12/240V £350. Mike, G4SZX not QTHR. (Thorne) 0405 813713

● YAESU FT790 70cm multimode as new. Ideal for packet. Nicads, mic, orig packing, whip aerial. £250. Mike, G4SZX not QTHR. (Thorne) 0405 813713

● KW2000 tcvr, mains PSU, h'book, ex diag. GWO. £150. Converted MF0FMCB mobile, 10m FM, 40ch, 4W £50. G0DCH QTHR. (Newcastle-upon-Tyne) 091-488 5210

● SHACK clearance. 2 Dressler linears UHFD70 £685 and VHFD200 £565. Both are in mint cond, c/w h'books. Prefer buyers collect because linears are small but heavy. (Nottingham) 0602 294572

● REALISTIC PRO2021 scanner. 200 mem channels. AC DC. Plus good quality wideband ant £125. Wes. G6KPC QTHR. (nr Barnsley) 0226 764545

● OLD mags. Short Wave Aug 35 No 1/Vol.1. British Radio Apl 26. No 1/Vol 1. Practical Radio Feb 32. No 2/Vol.1: £35 ea. Others, but not 1st issues. (Winsford, Cheshire) 0606 592466

● FARNELL 15A h/duty PSU. £50. VHF rotator: £25. Belemet 144MHz yagi £20. 20m 50ohm low-loss coax: £10. G0KPZ. (Sidcup) 01-309 1295

● TS680S HF tcvr with gen cov RX plus 6m. Boxed. Hardly used and over £200 cheaper than new: £750. Daiwa electronic keyer with paddle: £50. Am looking for dual band handie so would consider cash adjustment. G4URC not QTHR. (nr.Bristol) 0454 327429

● HEATHERLITE 2m Explorer linear amp: £325. New spare 4CX350 free to buyer of amp. G3YBG QTHR. (Exeter) 0392 74607

● FT767GX tcvr 70cm 2m, 6m HF all mods. Latest updated model. Only few months old. £1800. MM144 100W linear: £130. Bremi 13.8V-10A PSU: £25. Toshiba printer HXP550 £125. VDU £20. Tonna 9000E: £300. Howard G0HZH. (Woodbridge) 0394 460474

● DIGITAL DFC230 mem VFO suit TS830, boxed £120. CW filter, 250Hz YK88CN £35. ETM squeeze keyer GWO. £40. G3MCS QTHR. (Caistor) 0472 851567

● MARCONI H2540 G/C RX 0.1-30MHz. Latest synth sub-octave FSK carrier boards fits 2.4, 1.2, 0.5, 0.3kHz hi-stab osc, immac: £550. Would consider pt/exch Drake, Collins or other non Jap tcvr. G3YFK. 0743 884858

● DRAKE R4245. G3YFK. 0743 884858

● TRIO TS830S deluxe tuning knob, mic, phones with matching unit MFJ Versatuner. £600. Cash. G3ANF. (Milton Keynes, N Bucks) 0908 642403

● COLLECTORS items from 1940s and 1950s. Eddystone components inc 898 dial unit. Jason FMT1 FM tuner. Transformers for Mullard 510 and 3-3 amps. TCS modulation transformers. Many other items. List available. G2ARU QTHR. (Eastergate, W Sussex) 0243 543488

● TRIO TM201A 144MHz synth. Mobile tcvr, 25W mem and full scanning facilities. M/mount, mic. £175. G3VZT QTHR. 0403 710565

● LINEAR 2x813s grounded grid. 400W plus 3.5-28MHz. professionally H/brew built. Sold minus valves and PSU £100. Demo arranged. Bremi BRL200 linear. ideal converted CB RPG. £50. IBM 196C electronic typewriter. Error correction facility. Spare golf ball and ribbons £100. (Grays, Essex) 0375 378783

● ICOM 3210E D.B tcvr, complete £399. PSU 13.8V 7A regulated £18. Morse key Type-D. Good cond £20. Marcus G8HON. (London) 01-749 3156

● KW600 amp. New elecs. New 572B. Perfect. W/O. Clean, unscratched. Legal limit for £235. Any test. Trio SM220 scope inc BS8 pan display. Immac £285. Kenwood HC10. World clock. Immac: £75. Prices inc carr. G3RHM QTHR. (W London) 01-423 2329

● QTH. Aerial planning permission, semi-dnt 3 beds. 2 rec, garage, CH, gdns, loft shack. Quick sale £48,950. G8SIG. (Winsford, Cheshire) 0606 554178

● FT290R with nicads 15W PA/preamp. £180ono. 4CX350, base, transformer etc £35. Heathkit RG1: £25. Marconi deviation meter tunes to 1024MHz: £45. Approx 80m FHJ4-50, similar to LDF4-50, unused with N-type connectors: £180. Bill Bell G4WMB. (Pershore, Worcs) 0386 553984

● AVO sig gen CT378 type. Continuous range 0.45-230MHz. Output CW/AF/FM AM. variable modulation and deviation. Calibrated RF output variable to 1uV. Robust mod steel case. Little used. Lands and comprehensive h'book £75. 0732 63266 day. (London) 0426 927629

● MUST part with some old valve radios and portable gramophones. Some good, some tatty. Space needed. G3TAW. (Kidderminster) 0562 745628

● CAPCO SPC 300 ATU: £135. Adonis AM503 compressor desk mic £15. Both VGC. Post extra. G0IXC. (Harrogate) 0423 872997

● SHORT Wave Mag, Jan 70 to Dec 77. Clean cond in Easibinders. Offers inc post. G3UBS QTHR. (Ashby-de-la Zouch) 0530 415600

● SHACK clearance. HF linear amp Yaesu FL2100B, exc cond: £450ono. HF tcvr Trio TS180S. A rig before its time. Bargain: £500ono. The following are open to the highest offer. Dual band tcvr 2m/70cm Yaesu FT2700RH, immac. Mobile matching pair tcvrs 2m/70cm. fitting fronts, fit typical modern car dash. Trio TM211E and TM411E both also in superb cond. Ray, G4ILO QTHR. (Kidderminster) 0562 824930

● ICOM 751 speech AM filter, PS15, AT100. Mint: £900. Yaesu 726, 2m, mint £550. Honda generator 2kW 240/110V less than 20hrs use. Mint. £275. Pt/exch HF gear for smaller HF line-up, IBM clone PC WHY. G4YIP. (Northants) 0604 701634

● YAESU FT767GX, immac cond with 6m and 2m modules fitted. Latest local board upgrade fitted by SMC. With mic MH1B8, users and technical manuals: £1250ono. G0KMW QTHR. (Abingdon) 0235 21921

● 3ELE tribander plus 40ft Versatower. Purpose built shack comes with 3 bed semi. Full gas CH, double glazing, modern kitchen, driveway 3 cars, 100ft secluded rear gdns. Rural Surrey access M25, A3. Waterloo 3/4hr: £110,000 ono. (West Horsley) 04865 2808 eve

● NEC PC8201 portable computer, 64k RAM, disk drive, built-in editor, Basic and comms plus assembler, Manuals, s/ware, carrying case, tech ref etc. Snil mobile packeteer?: £250. Portable batt powered printer, Epson compatible, manuals: £50. Carrying case for computer backup batts, chrgr, modem. Spares or repair: £30. Back issues of Byte, Personal Computer World. Sondler list. Please write to Richard, G4RIK OTHR.

● KW1000 linear int PSU. Exc.cond: £250. Kenwood ATU AT230, new: £100. HF5 trap vert with radial kit. Never used: £70. FT209R h/held 3.5W with nicad chrgr. As new £140. Jaybeam O42M 4ele quad. As new: £50. G5CW OTHR. (Colswolds(0451 30518

● 4ELE 20m beam Z040BA: £165. CR100 £45. HRO rcvr: £65. FT7: £300. FT200: £165. Trio 2m 9130: £300. G4HXU OTHR (Thame, Oxon(08442I 3381

● 2M colinear new ant 5.2 gain 200W tcst'for: £25. Kodak rostact camera type EK160-EF, electronic flash. Exc.cond: £15. (Poole(0202 666299

● LASER page printer. Twin paper cassettes, two emulations, HP Laserjet, Epson-FX, Diablo 630, IBM-PRO, Qume Sprint II, 3 resident fonts. Courier, Prestige, Gothic. Serial or parallel interface c/w manual. Pwr load. Drum and form inc. New, boxed: £1250ovno. 01-804 4565

● YAESU FT77 100W 8-band tcvr with FC700 ATU. Filled FM and CW narrow filter, c/w m/mont ing kit MH1B8 mic and manuals: £525ono. G0KIH (Farnham(0252 722139

● DATA General DGI portable personal computer, full size LCD screen, twin 3.5ic 720k drivers, int nicads, mains PSU and nicad chrgr, carrying case, with MS-DOS, Basic, and various s/ware: £350. Gemicom 3400 wide carr printer with serial interface: £50. Digisolve CC2123 modem, V21/23, Hayas command compatible, BT approved: £50. Mike Gathorgood G4KFK (Slough(0753 40520

● YAESU FT101 Mk2 r0-160nr fan, spare PA valves, plus FV101: £275. 144MHz SSM tvtr QQVO6-40PA: £45. 70MHz rvtr QQVO6-40PA: £45. Both compatible with FT101. Hammerlcod SP600JX rcvr: £130. SEM 70cm cvtr: £20. FT101 spkr: £20. Ilt-mound BK100 knyttr: £20. All good cond. Cromar 920 electronic organ, cost £1800. Mint cond: £600. All buyer inspects and collects. G3FRQ QTIIR (Oakham(078086 569

● FT203R Yaase FNB4A batt 2 nc'ls, brand new. Offers please. Steve, G6FDK OTHR. (Chester(024-I 300779 or 0925 36079

● WW2 aqcrp R1155N, mint, 38 TX/RX plus accs. New Zealand ZC1MkI TX/RX, valves inc new 829B, 813s, wooden US Army telescopic portable mast heavy duty, crimmller AMTX plus 2X807 crcirculler amp. 2X807 modulator. SAE list £60. Woc'l separate. Yoc collect. G3FYF OTHR (Goldlord(04867 4901

● DATONG FL3 filter: £60. G4OS QTHR (Snrbiton(01-390 1566

● ALTRON SM30 30ft tower, post, mount. VGC. £150. Eric, G4TBR QTHR. (Amersham(0494 786510

● WIPO micron QRP tcvr. Full house. Built to professional standard. £180. Yaesu FRT7700 ATU £28. Collect or post extra. (Taunton(0823 289443

● JRC NRD 515 HF rcvr SSB/AM/CW filters fitted. Immac h/book. £650. Or offers. Blaupunkt car hi-fi Dolby stereo cassette radio. Model Atlanta SQR47. As new. £150. Or offers. Mike, G4FBK OTHR (Northwood(09274 22766 after 7pm or w/e

● SPECTRUM analyser polaroid 10MHz, 2GHz: £400. Racal RA1217 transistor 1MHz, 31MHz: £300. FT757GX model ARQ: £700. Manuals G4OSJ QTHR. (Oakham(0572 86451

● COMM rcvr. Realistic DX302, 0-30MHz. Digital freq display. Mint cond. One owner: £100. G4TKQ QTIIR. (Leicester(0533 395611

● CW-R1 TY code master. Realistic 50ch scanner, 68-512MHz, 2m 14elm met beam, 70cm beam. Pye Westminster 70cm 433, 150/250/175/500 and 750/ 40ft indrstrial aerial mast in 2 sections. Sensible offers please. GOLET, 0836 745217 day. (Nolling-hram(0602 277941

● DX1000 comm rcvr, Bearcat, 0-30MHz all-mode dial, keypad, filters, noise blanker, clock timer, tape output. £265. G4ZIJX OTHR (Weston-super-Mare(0934 512141

● YAESU FT7B tcvr 80-10m, FM, 160m, mic, manuals. Matching FP12 PSU. In exc cond: £375 inc Seconder del. GW4RLP OTHR. (Caernarfon(0286 5264

● YAESU FT780R w/lr manual and 19ele 70cm lonna: £325 cash. Buyer collect/inspects. QTH 1/ 4 mile from J36 on M4. Mike GW0MNP now call Old carl GW6XCG. OTHR. (Sarn(0656 724041

● ICOM IC720A all mode HF 100W. VGC. Now OTH maisonette, no aerials! £600. Daiwa ATU CN-I19 w/lr PEP mod/no. £160. Yaesu FF501 1kW LPF. £20. All VGC. 12in B/W monitor: £35. Plus carr. G4RNI not QTHR. (Gateshead(091-469 0724

● SCANNER Realistic PRO30. VGC. 68-512MHz, 16ch. Programmable. Cheap to clear: £100. Graham G7EVY. (Preston(0772 812778 6-8pm

● UNIQUE opportunity to purchase 2 modern military radio stations. One is HF, 2-30MHz, AM/SSB/CW, 100W with removable 20W manpack set. Other is VHF/FM 36-76MHz, 25W with removable 3W manpack set. Clark 12m telescopic mast with matching wideband VHF coax dipole also available. Particularly keen to price/sell for Racal PRM404r, MA4040, VRA4026, PRM4090, MA945 or any green alloy-based Racal items. Complete, incomplete, working or not. Send SAE for colour photo and full details of items for sale to Bob, 120 Birmingham Road, Redditch, Worcs, B97 6EP

● CAPCO magnetic loop ant, model AMA3 14-30MHz. As new: £230. G0KHJ QTHR. (Bolton(0204 708942

● RA17, GWO £180. Signals batts, lead, aed, dry chrgd 22AH: £15. B28, GWO: £50. Voltage stabiliser 240V 500W: £20. Heavy. (Beccon-on-Trent(0283 44677

● YAESU FT767GX: £1000. Yaesu FL7000 lrcoar: £1000. 2m MM4200W lrcear: £250. (Heysham(0524 51896

● CUMBRIA. Kenwood TL922 linnar, 4hrs use. Tone terminal sends reads CW/RTTY/ASCII. Sacyo crontor, computer cnecessary. 30ft trolfrs mast base, post mounting. Icom electrol desk mic, ICSM2, Encr VDU keyboard. Deliver reasonable distance. G3NZT OTHR. (Windermere(09662 2548

● FT10rE plcs FM board. Good cond, clnb levr, trence co ollors: £350. Buyer collects. Glcon G6HFF. (Bolloc(0204 63459 cva

● TS440S £850. Vrbrakeyor: £55. G4MH minibnam. £40. BNOS PSU 12/25A: £150. Kenpro KR400RC rotator: £100. Jaybeam O6-2m acl. £25. Allron SM30 telescopic mast. £150. All carr extra, but SM30 mast to be dismantled and collected by buyer. G0GLL QTHR. (Halifax(0422 365600

● RCVR. Trio R600 1st class cond. £200. Steve G0FLN. (Billericay, Essex(0277 651313

● ATU SEM Transcnrch w/lr bnlr in Ezilcor: £65. G4VWB QTHR. (Derby(0332 551945

● PACKET system BMK. Eprom. Dragon computer TNC, PSU. Leads. VHF/HF, sirple acdcasy to nsc. £85. G4HZF QTHR. (Grimsby(0472 71215

● CLARKE heavy duty 40ft telescopic pnocmatic mast with self supporting legs. Cost new £3000 ldnat hold days etc. £450ono. Army bomb disposal raam comm kit, based on Pya PFI 70cm system. Complete, mint. Boxed. £1200no. Interesting missile guidance sights consisting of Xr0 telescope. £20. PASS night vision binoculars, mint cond. £250. Sorry 1CF2001D, mint cond. IIF airband. £250. G6CUO. (Redditch(0527 892282

● YAESU FT290R Mk2 multimode 2cr w/lr batt chrgr, plus mirbracket. £325ono. GW8YJN QTHR. 0437 781265

● FT980 tcvr. Exc cond, hardly cscd. Manual, boxed. Offers near £1000. Howard, G0HZH QTHR. 0394 460474

● Icobra, m/bracket, manual, 7/8 whip, gntlcr mont. All exc cond. Bargain £300. Trio TR2300 w/lr carry case, 20 crcads, chrgr, whip aclial, robnstng, scllicg w/lr regrot: £110. GW1BGD QTHR. (Swansea(0792 583522

● YAESU FL2100B linear. Serviced at cost clearly £300. Now pair 572Bs. Fitted with cracs lillar and all loads. 100pc working order. View Dewsbury Electronics, Stoorbridge, or enquiries. G3BWN QTHR

● SWAN 350 w/lr marchicg p/pack acd Shcre 444 etc. Also mobile p/pack and DC nodels. All in perfect order: Offers? (Scunthorpe(0724 732312

● FT101E, VGC, orig packing, lac, mic, CW filter, 12V leads, h/books, spare new PAs: £300. Eric, G3RXJ QTHR. (Newick, E Snssex(082572 3355

● IC701 c/w PSU, packing, h/books etc. £550. FT690 with 6090 10W lircar. £380. No phono, please w/lte. G7BOD OTHR

● ICOM IC271E 2m. Base all-mode, 25W good cond: £300. BNOS 2nt linear 180W out, 0-10W in. Good prcmtrp, 11mths old: £200. 6ele bcad w/lr rotator, control cnblo and coax: £50. Complete station: £475. Will deliver to Southrampron, G8PZH (Isle of Wight(0983 298331

● TRIO TM201A FM 25W mobile: £175ono. MM 10-2nr tvtr: £70ono. BJ200 Mk3 h/held scanner extended cov. As new, only 4nths old: £150ono. All plus post. 0698 357869

● MATHS co-prccnssor, Intel D8087-2, for IBM PC/XT/c'bones ep to 8MHz, inc 2086. New: £45. G4LKI QTIIR. (Frome(0373 65666

● YAESU FC700 HF ATU, mint cond. 80-10m 150W swr PEP pwr. 15-150W nrctorring. 100W dl load, manual: £100. GW4RLP QTHR. (Caernarfon(0286 5264

● DAIWA NT20E 2m FM rnnhipurpose tcvr. Thris rig will give you 20W mobile and 10W portable. Carry cash, chrgr: £260. (Wooler(0668 6228

● TRIO TX599 transmitter and JR599 rcvr matching rigs linked for TX. HF 100W plus rnic, spkr, cnarmals. Perfect: £250 pair. (Sideep(01-309 1295

● HEATHKIT HW7 low pwr TX/RX. G3JIC OTHR (St Helens(0744 23916

● PYE Europa 70cm 3ch mobile. No leads w/lr rnic, rmannal etc: £25. John, G0IJJX QTHR as G7BTU. (Kidderminster(0562 743481

● CREED 444 teleprinter sperb cond: £25. ST5 trrminal unit: £40. Buyer collects, Northern Ireland. GI4ZAH QTHR. (Castlerock(0265 848815

● SONY ICF7600D rcvr plus active ant, ANT Org boxes and documents. Exc cond: £100 to both. G0MEN. (Plymouth(0752 492590

● DRAKE C line RrC, T4XC, AC4 and MS4. All mint. £850. TR7 upgraded to TR7A with filters AUX7 and PS7 PSU. £900. L7 linnar in mint cond. Offers? G2DAF linear with PSU. May need work. £95. 01-438 r600 day, 01-722 7049 after 6.30pm

● STORNO 614 repeater base c/w deplexor high-band. £200. Tait T198 mobile R/T CTCSS cradle spkr mic. £225. Pye pocket freq counter with case and chrgr. GWO: £40. Essex Telecom talkthre basestation. Desk-top wooden cabinet high band. £150. Brandepl UHF h/held 3ch with nicad. £10. Pye Westminster W15AM high-band dashmount: £10. Cleartone BC2C chrgr: £10. Pye Olympic M20I high-band: £10. Dymar Lynx high band AM. £8. G4AJE. (Cambs(0354 741168

● BELCOM LS1026 10m multimode: £170. CTE 10m preamp: £15. Yaesu 101 spkr: £15. Creed 444, TU, paper, stand: £50. G0BXN (Stanford(05438 2289

● YAESU FTONE gen cov levr, all options fitted, manuals: £780ono. Roger, G0KDR QTHR. (Snlforlk(0728 79405

● KENWOOD PS30 £80. Kenwood AT230 £140. Cond as new. Kenwood SP230: £40. G4YIT QTHR (Whittlesey, Cambs(0731 20 268

● 2XC mount camera lenses. 1x Nikkor 1:1.8 F25mm with ins control. With lens cover: £18. 1x Cosmicar 1:1.8 F22 66mm with zoom and ins control. Lens covers and carry case: £70. Prefer buyer collect. (S Croydon(01-651 5147 anytime

● TRIO TH21E FM pocket levr, c/w 2x PB21 cicads, BC3 batt chrgr, SC8, soft case. Daiwa VHF trcear amp, LA2035R. All boxed. Pins complete fillings for mobile nse, mic gnBcr mounted ant: £200. G4UTG QTHR. (Poole(0202 674285

● ALTRON AT42, 3yrs old with new grnd post. Max height 44ft. £350. G4ZEK. (Colchester(0206 851343

● TRIO TS780 dual-bander, late model, hardly nsed. Mint, boxed. £625. Collins 75S1Rx, £275. Byt collects. G4LW QTHR. (Trowbridge(0225 753166

● YAESU FRr101D Rx, HF/VHF, 6.4.2nr. £160 collers. KW 160 ATU, £25. Doro SSTV Unit, £80. Datong ANF filter, £35. 144/432MHz Rx converter, £15. Bnaccal Rx scanner, £70. VTX 5000 modem, boxed, book, not used, £37. Sinclair ZX Spectrum, icterface 1, RS232 lead, 1 micro-drive, not usad, £40, no splits. Matt Lee, 26 Bromford Crescent, Erdrngtoc, Birmingham 021-350 0048

● YAESU FT77 (IF TRx, FP700 PSU, FC700 ATU, FV700DM digital VFO, £700 ono. Sold as seen. Property of late G0BHF. (Binsted, Hants.(0420 23594

● FT203 handheld w/lr mobile bracket, 12V adaptor, mains chrgcr, £125. Misc 2nr mobile wlnps and mounts, £20. Howns 2-6m Tvtr, £125. John G7DOX (Dockinfield(061-338 8731

● YAESU FRG8800 rx, £550. Yaese FT7 mobile Tx/Rx 80-10m plcs 160m, £350. G3NMZ QTHR (Luton(0582 591749

● ALTRON AQ620 10-15 20/6m beacr. Used for 1yr. Exc cond. £120. Spectrorc 128 plcs 2A computer. Almost new, c/w PSU. Boxed. £110. GI4IYWO. (Fcahabers, cr Elgin(0343 820955

● 2 INTO I switchos, 6 of 1, £9aa. Kenwood MC55 oodm cnko, PTT swilch box, £15. 19 o/a MET 2m antenna. £25. 2 Commodore VIC20 coorputers empio. £20oa. 16k expansion for VIC20, £5. GM4WDO OT1IR. (Borwick(0289 82464

● AMSTRAD 1512DD mcca, DMP 3160 printer, all in exc cond., £485. G4RPA QTHR. (Begnor Regis(0243 862629

● SILENT KEY complete station: Icom IC745 with PC35 PSU FM board. Icom IC-AT100 ante ATU. 3 ele Triband beam + Hygain TH3 Junior. Rotator Controller/indicator. SSM Transmatch. Datong colch filter, IC240 2m FM. Prefer sell complete, £1000. May separate. Contact G3ESW QTHR (Stafford(0785 662350

● KW600, new olocls, cow 572B, nescratchrd. Acy tcst, £195. IC-SM5 base mic, £27. AR22 rotator, new ballcaga, controller, hardware, 40ft 4-way cable, any tast, £65. Daiwa cross-needle CN-410M meter, £40. Hacreg HM207 scope w/lr monitor adaptor, £45. Health reg 1-400V PSU, bias, transistors, twin meters, £25. Carr at cost. No offers. G3RHM QTHR (West London(01-423 2329

● CIRKIT 20W 2m Amplifier £30; Pair PFI Rockorphones on RB0 £25; Pye Reporter AM on 70.260MHz £40. Pye PF5 on RB14 £30, Solarton CDI 400 deal beam scope £60. (Milton Keynes(0908 665705 w/ends.

WANTED

● RACAL TI20 transmitter drive unit. Any cond, anything considered. Also RA63 Racal SSB adaptor. Cabinet for Racal RA117. Distance no object. (Bromley, Kent(01-462 4461

● DRAKE MN2700. Drake MN2700 am tunnr mnt. Urgent. Drake PS7 PSU. Urgent. Top cash price paid. Please call anytime. (Notts(0602 609345

● RECRUITING 24 would-be club members, all British Amateurs, to share in the enjoyment as well as the running costs of a radio amateur exotic tropical island beach villa. QTH c/w HF station, to be shared at the rate of two weeks per member annually. 0908 668169

● OLD valve car radios or parts and m'lo. Any cond for restoration. Wanted. Quad valve amp or parts, any cond for restoration. Wanted WS18, WS19, WS22, WS46 etc for restoration. Eventual nurscunse. Jim G4XWD (Kidderminster(0562 823674

● PAIR 3.500z valves and bases, or pair 4.400. Bill G0EEW. (Barnstaple(0271 I1227

● NICAD batt pack FNB4, 12V. Also chrgr NC18C for Yaese HH FT203R. QTHR. 021-357 2009

● MM 50/500 freq.counter. Geale, pse, to QTHR (London(01 602 1697

● EXPANSION unit and hard disk for Amiga 500. Low pass filter. Small ant rotator. Hand scanning mic for FTONE. Spkr/mic for Yaese FT207R. Also to complete my workshop, arc-weldnr, compressor. Stock and die set to thread 1/2, 3/4, 1in w.die barrel. Ken Lee G4HYQ, 14 Spring Meadow, Holly Spring Lane, Bracknell, Berks. 0344 483696

● H-HELD scanning rcvr. Mnst cover 70MHz band and capable of AM and FM switchable for all freqs covered. G8GZZ QTIIR. (Woking(0483 723506

● SX28, R4C, 3TF7, into for NC190. Chris, G8JFJ. QTHR. (Horndean(0705 596836

● DRAGON disk drive interface circuit or interface unit, or complete disk drive. Split screen, comms prog for PK232. Use with PCW8512. G3IVB (Cambridgeshire(0223 870891

● AP1086, RAF stores Rel nos. All sections particularly 10-10A to 10Z. Also Air Publications relating to radio, radar and navigation equip, such as Babs, Oboe, Loran, Gee, H2S, Roboosa, Eureka system etc. Also would purchase post-war to current Magnetrons, Klystrons, TR cells and special types of EEV valves. Expense allowed. Martin Gne, 17 Foxley Close, Mountford Estate, Pemchill Road, Hackney, London, E8 2JN. Rcg anytime. 01-254 9083 or 01-790 2846

● CHEAP TNC and 2m FM tcvr. Will/brow considered. G4WJX. (Stoke-on-Trent(0782 330613

● YAESU FT726 w/lr 2/70/sat. Prefer coll rc good cond. World consider Trio TS780. Cash waiting. Mike, G4SZX not QTHR. (Thorne(0405 813713

● ALTRON telescopic tilt-over lattice type mast 15ft sections c/w ground post and winches. Similar make considered. G4PZD QTHR. 0524 414030

● YAESU FV102DM ext VFO. Top cash price paid and collection arranged. Cliff, G3NDC QTHR (Stanmore(01-954 1309

● UL41, UAF42 valves required to restore Eddystone RX for VK ham. Your price paid. G3MCS QTHR. (Carlton(0472 851567

● YK88C or YG455C CW filter for TS830S. G3HIIM QTHR (Hagley, Stourbridge(0562 885525 eva w/e

● MICROWAVE Modules lvtr, MMT70/28 70MHz tvtr or MMT50-28 50MHz tvtr, for csn with HF10cr tcvr. Robic, G4IRD QTHR. (Northampton(0604 644341

● CLARKS nrast 30-40ft. G4IIXU QTHR (Thame, Oxon(084421 3381

● SHIMIZU SS1055 HF QRP. Must be VGC. G3HLI. (Coventry(0203 456128 eve

● MANUAL, h/book, circuits for Racal MA79H driver, DA41206 FSK modulator, DA34000 amp, EA36500 PSU. G3AVI QTHR (Herne Bay(022737 3571

● 1.4MHz xtal 1000pl lead-thre crps. 500V or 1000V, chncky End type. Valves 6F33 and QQVO2-6. (Selram, Cambs(0353 720583

● IC260E must be in nrmac, pristine cond. Nothing else accepted. Top price paid. Mark G4RGB. (Girlingham, Kent(0634 30822

● SOUND recordings of QSOS. I'm trying to find out when the earliest all-air recordings of amateur QSOS were made. Recording equip was advertised in the T and R Bulletin in the 1930s. Do any pre-war recordings survive? I'd like to know! Write or phone with any info please. If enough examples exist, I would compile a discography of them, which I would be free to anyone sending an SAE. Also wanted: Info on, and preferably ac exacrpts of, tc any cond, the Fox transmitter, made by the Fox Radio Com Leics in the late 1930s. Good price paid for mint example. Norman Field G4LOF, 14 Rogent Rd, Harborne, Birmingham, B17 9JU. 021 426 3663

● CIRCUIT for Tokyo hy-power 144MHz pwr amp 11L35V. Costs refcrdred. Ext VFO 520S and DG5 digital display for TS520SE. Expander 430X and IB3 with connecting cable for cr.cli 750XX. Doog. G4BEQ QTHR. (Locks Heath, Hants(0489 582423

● ARGONAUT, TX, Trio TS120V or other QRP TX/RX. Also Datong FL1/2/3. 30ft lift mast. 80/40 vert ant. G2CYN. 0234 711538

● YAESU FTV901R 6m mode'a only. Good cond. G4SUX QTHR (Wiltshire(0249 814315

● URGENTLY wanted ICS TOR 1 radio telex terminal, also 11nsky M208 or Honker portable compeler or accs. Purchase or p'ex for Yaesu FT70 2-30MHz manpack tcvr, IC505 50MHz all-mode, 28MHz all-mode, 2-9MHz Racal QRP tcvr, 2182kHz h/held convertable top band QRP. Bob (Redditch(0527 64885

● FC102 ATU GW4RLP QTIIR. (Caernarfon(0286 5264

● PWR pack for B2 TX/RX. Homebrew will do. Jim G3JIC OTHR (St Helens(0744 23916

● WILL pay a good price for pre-war Eddystone dial and knobs to complete long-standing project, 1/ 4m shafts end narrower. Also needed set of Eddystone USW coils. Bernard Lillorland, G4IIAT OTHR (Chippenham(0225 891254 anytime

● MULLARD CRT 56817 or 56806 for Gould OS5100 scope. Tail TS30 VHF radio. G4AJE (Cambs(0354 741168

● MZ80K twin disk drive, I/O box and printer. All manuals in good cond. G4JMX OTHR (Manchester(061 766 7403

● EARLY wireless sets wanted. Also horn speakers, dial sets, horn set shaped radios, early Ham rcvrs. Any cond or incomplete welcome. Also early books, components, catalogues, Wireless Worlds. Drake MS-4, Sherwood filters. James G4ERU, 5 Lniller Rd, Winton, Bournemouth. 0202 510400

● JENNINGS vacuum variable cap. 12.500pF, 7500V, part no. CSVF 500/UUCSF-500. 0207 from 111. Mackay remote ATU: £50 cash waiting. Free to nnsenra. Creed 1NDS/INDC morse perforator reader units. You collect. Tim, G4DNV. 0423 781446

EXCHANGE

● ICOM IC2E h/held mains and car chrgrs, separate mic/spkr. Black Star 600MHz freq counter or similar. G3JIE OTHR (Norwich(0603 714686

● GEN COV RX. VGC. FRG7, unmodified for KW tcvr. Must be GWO. Must be electronically sound. Mikn, G0JXX QTHR (Southampton(0703 443781

● EXCH mint TR2200G 2m portable 6ch inc R5, R6, R7 for Eddystone EC10 Mk2. G18DGB IN Ireland(0247 85413

● QUARTER acre QTH, 10mins final walk town centre. 16x10ft shack in orchard. Tennamast lolbeam 3 beds dbl house, sem/bungc, garage, carport, caravan parking, greenhouse, trcil, veg gdns. World like exchange. QTH. Requiring updating considered, or could sell. (nr Shrewsbury(0938 552059

● EXCHANGE IBAVT mnltiband vertical or buy outright your ATU KW107/109. Your price. G3XXO (Worksop(0909 472316 anytime

PTFE SHEET SOURCES?

A bumper mailbag this time and I'm not sure how much we'll get in; we'll just keep going until Mr Editor wields his dreaded blue pencil. First, a note from Mr J Edgerton, G0EDG, who said 'I read and enjoyed the article on the construction of a QRO low-pass filter - but the instructions call for 20 thou (or two sheets of 10 thou) PTFE sheet. Where, please, can it be found? Hmm, good question. We used to get it from a little shop in Shepherds Bush years ago but when I rang them last week to check it had turned into a greengrocers - ah well. Anyone know of a source of PTFE sheet? Write to Mr Edgerton at 3 Walnut Tree Close, Lower Almondsbury, Bristol BS12 4EE, or let us know so that we can tell readers. I must admit I'd very much like to know the answer to that question myself.

FT790 RF FEEDBACK

Next, a plea for help from Mr Mark Rogers, who writes 'I have an on-going RF feedback problem with a pre-amplified desk mic which I constructed about two years ago and have been unable to use with my FT790R. The mic consists of a metal RS console case with a 6 in gooseneck containing a Tandy electret insert, the amp is a single BC109 with variable gain. I use an identical unit on 144MHz with no problems. I have tried all the usual decoupling methods, including ferrite beads, capacitors to earth from all input and output points including the mic plug and all the cable and three different types of screened lead from the mic to the transceiver.

I've also tried using different inserts, levels with decoupling on the mic line, different methods of powering the amplifier (9V battery and 5.6V from the FT790's mic socket) and decoupling the up/down switches to earth. On SSB the system sometimes takes off completely, on FM there's just a high-frequency whine. It isn't the radio since I've tried it with another 790 and the same things happen. Any ideas?'

Sounds extremely tiresome to us - anyone got any suggestions? If so, Mr Rogers is at 662 Maidstone Road, Wigmore, Gillingham, Kent ME8 0LH.

OTMF TONE-GEN CHIPS

An easy one now from Mr P Hart, G4KVP, who says 'I am interested in constructing a number of projects which involve DTMF tone-generator chips. Unfortunately I can't find a supplier. Can anyone help?' We had a quick flick through the various catalogues on our shelves but couldn't see any, although there are a number listed in the 1989 Philips Components 'Quick Reference Guide' so they do exist!

Anyone with any better ideas is asked to let Mr Hart know - he's at 11 Kingston Road, High Wycombe, Bucks HP13 6UJ, or give him a bell on 0494 459777.

AMIGA PACKET TNCS

The next letter says 'Dear Helplines. I would like to try packet and wonder whether anyone uses an Amiga A500 and could give me some information on the TNC and software required. Also, is it possible to make TNCs from scratch, or are circuit boards available?' The writer is Mrs P Bates, G0IYD, who lives at 29 Juliet Close, North Walsham, Norfolk NR28 0SY. Our headquarters packet guru says that a number of stations use these machines so perhaps anyone with Amiga packet experience could get in touch.

Almost all TNCs are controlled via the computer's RS232 port so all you need on the software side is a simple terminal programme for your computer. As for hardware, there are still one or two homebrew TNCs available; one we know of is by Peter Morling, G0BSX, who can supply a high-quality plated-through PCB and documentation (but not components) for £16.50. Peter is QTHR in the 1989 Callbook and if you are into construction then this may be an interesting approach. It must be said however, that the price gap between kit and ready-made TNCs is now quite narrow and unless you are home-brewing purely for the fun of it, little or no saving will be made.

LOWE HELPS OUT

We enjoyed the next letter: it was from Lowe Electronics and went like this. 'Dear Helplines. Just spotted the plea for info on the R-300. We do stock the complete service manual for the receiver, at a cost of £4.50 plus £1 p&p. We also (merrily) still have two amateur band bandspread drums in stock - part number D09-0016-04 - at £2.11 inc VAT plus £1.50 p&p. Seems like a bargain to me! We're happy to help when we can. Mrr Inx le Lowe director G3PCY for the info.

8 TRACK TAPE RECORDER WANTED

Now on item from G3KPO, he of the excellent Wireless Museum. Doug says 'Has anyone an eight track cartridge recorder tucked away under the bench? A recorder for old continuous-play cartridge players, which came out just before cassettes, is desperately wanted by G3KPO for use in the Wireless Museum. There are still a few cartridge players about, but all the recorders seem to have disappeared.' Can anyone help? If so, drop a line to Mr Douglas Byrne, G3KPO, at 52 West Hill Road, Ryde, Isle of Wight PO33 1LN - or ring him on 0983 67665.

SOLID STATE VALVES

Mr M J Roberts, RS68032, asks 'Has any amateur become involved in making up solid-state plug-in replacements for valves, i.e. making up a small assembly of ICs, transistors, diodes, resistors, etc on a small piece of Veroboard with leads running on to the pins of an old valve base? I have made up 'diodes' (using high-voltage FETs) and rectifiers in this way but have not tackled frequency-changers.

Can anyone suggest suitable solid state alternatives for, say, the ECH35, possibly using a dual-gate MOSFET? Such an equivalent should be a stand-alone replacement, with no flying leads underneath the chassis.' Sounds intriguing - this sort of thing was certainly done professionally in the 1970s but we haven't seen any hardware for some years. Mr Roberts is at 26 Beech Avenue, Brentwood, Essex CM13 2DX.

FOR NEWBRAIN READ SUPERBRAIN

A short and sweet letter now from Mr N Penketh, G3RYY, who writes 'Would you please be so kind as to correct an error that occurred in a 'Helplines' item in the December 1989 Radio Communication? You printed 'Newbrain OD' computer when it should have been 'Superbrain OD' computer'. Er - sorry about that, can't think what came over me (dull thud of editorial cash sinking into skull). If you've got any info on the Superbrain OD computer, please write to Mr Penketh at Greenways, Bolton Road, Duxbury, Chorley, Lancs PR7 4AJ.

SICK SAFGAN SCOPES

What's next? Mr Patrick Billingham, G4AGO, tells us that he is responsible for the Electronics Department at Brighton College and that it has six Salgan DT520 oscilloscopes, which were bought in 1982. Mr Billingham says 'These are now becoming unreliable and in urgent need of overhaul. Any circuit diagrams or service manuals have long since disappeared, and I gather that the manufacturers are no longer in business. Although the standard of performance of these 'scopes is not outstanding, the simple front-panel layout makes them excellent instruments for teaching beginners, so I am not anxious to get rid of them. I would be most grateful if anyone could supply any technical information on these items. If any reader knows of any in full working order that are for sale, I should like to know'.

Any Salgan aficionados out there? Mr Billingham is at Brighton College, Eastern Road, Brighton, East Sussex BN2 2AL. I know what it's like when your favourite scope starts getting old and tired, my dearly beloved old Tektronix Type 547 is well on her way out and it's breaking my heart.

FL200B CIRCUIT

Mr Alan Strong, G3WXI, writes 'I should like to enlist the assistance of 'Helplines' to obtain a photocopy of the instruction manual and circuit diagram for the Sommerkamp FL200B transmitter. I can offer similar information on the FR100 receiver and FL1000 linear. Naturally I will reimburse all costs'. Nice easy one there - Mr Strong is at 50 Willow Park Road, Wilberfoss, York YO4 5PS.

TELL TOM

Now an enigma: "Who is Tom?" asks Mr Peter Marshall, G0IOX. 'I have received QSL cards from the bureau for Tom, G0IOX, both base and mobile. The cards are from SP7OGP (8/10/87), AI5P (17/10/87) and a few more. If Tom would like to contact me I will forward the cards to him. Regards, Pete - the real G0IOX!' Hmmm - was that a Jolly Roger I noticed just now, fluttering in the breeze...? Peter Marshall is at 11 Alver Green, Bideford, Devon EX39 4DL just in case it's a genuine misunderstanding.

MYSTERY RADIO

Talking about circuit diagrams, please have a look at the diagram which is shown on the right (yes, Helplines is going up in the world - we've even got a diagram of our own this month!). This accompanied a letter from Mr Keith Philips, GW8WNB, who said 'At a recent mobile rally I purchased a 145MHz transceiver and 5W amplifier which had been shoe-horned into a plastic box. When I got it home I discovered that the transceiver was originally a handheld which had been fitted (minus its case) into a plastic box. It seemed a worthwhile project to get it going again. It's a six-channel crystal-controlled device and has the legend KP-202 printed on the PCB. Neither Lowe Electronics nor SMC were able to identify the rig and at the moment I'm not sure where to go from here, so I've made a full-size plan-view drawing of the transceiver in the hope that someone might recognize the layout and be able to help.'

There's a challenge! If you recognize this rig, drop Mr Philips a line at 39 Llwyn Ynn, Talybont, Llanonelth, Gwynedd.

STANDARD C146G DIAGRAM

Mr S A Morton, G8SFR, asks 'Does anybody have a circuit layout drawing for a Standard C146G 144MHz transceiver? I'm particularly interested in the tunable inductors and capacitors. If so, please contact me at 2 The Coppice, Pembury, Tunbridge Wells, Kent TN2 4EY.' Mr Morton's phone number is 0892 824938 and he's also got a fax machine on 0892 825134.

CO 90 GROUP RARAR TECHS

Next, a letter from Mr John Crabbe, G3WFM, who says 'I would very much like to know whether there are any readers who served in 90 Group RAF in the early 1950s and were involved in electronic countermeasures work. I served at RAF Watton in 1950-1 as a radar technician working on equipment and aircraft used in this role and I am trying to collect information, photographs, etc of anything associated with this work. I know that some of my fellow airmen were stationed in amateur radio then, and I wonder whether any of them are still active. I first became aware of amateur radio by tuning into the amateur bands on the R1155 receiver fitted in the Avro Lincoln aircraft used for ECM at the time. Please write to me if you do have anything useful and I could perhaps write an article about it for Radcom sometime.'

Yes please sir - sounds brilliant. Ex-90 Gp guys, help make Mr Crabbe's article possible and drop him a line at 47 Torrington Drive, Potters Bar, Herts EN6 5HU. Can't think why that address sounds vaguely familiar.

FREE PSU BITS

Here's an offer someone surely can't refuse. Mr R Tomkinson, G4TGJ, writes 'Several years ago I acquired a number of high-voltage transformers and capacitors, with the intention of building valve equipment. Since then my interests have changed to solid-state QRP so they have been gathering dust. If anybody can find a home for them, they can have them for nothing if they collect them.' Well, we had to force ourselves not to go belting round to Mr Tomkinson's residence ourselves - write to him at 58 Chaplin Grove, Crownhill, Milton Keynes MK8 0DG and form an orderly queue.

STANDARD FREQUENCY RECEIVER AMENDMENT

Please note that an error crept in to the circuit diagram as published in Figure 3 on page 75 of the November 1989 RadCom. Pin 9 of the MC1496 IC should have no connection made to it and the existing connection which runs from the end of the 3k resistor should instead go to pin 12.

YAESU DRIFT PROBLEM

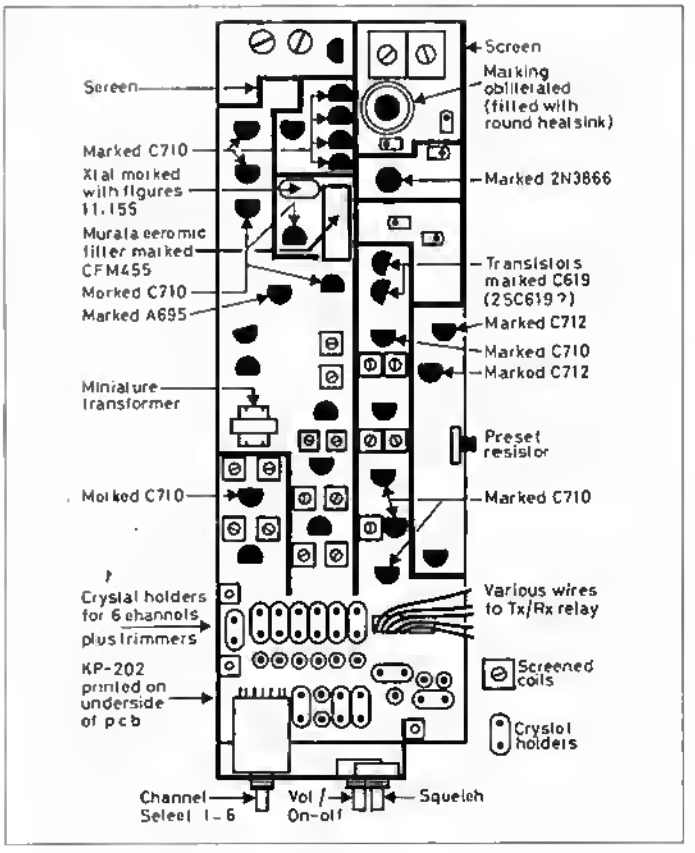
Here's an interesting letter from Mr J West, G4LRG, who writes 'For some months my father (G0MMV) and myself have been trying to solve a drift problem on a Yaesu FT757. In simple terms, the actual operating frequency was moving whilst the displayed frequency remained stable. The equipment was returned to the authorized local dealer for investigation. They held it for some weeks and eventually it was returned to us; they had been unable to trace the fault.

'The problem was still very apparent and we decided to write direct to the manufacturers explaining the problem. This proved to be the best course of action, and after three letters the problem was solved. They even sent us the correct spare part with which to do the job. This was accompanied by enough detail to enable us to complete the repair ourselves.

'It's also worth mentioning that they made no charge for either the information or the spare part, although the set was no longer under guarantee. For members who have rig problems and who are a little apprehensive about delving into the complexities of their black boxes, I would suggest that a letter to the manufacturer explaining the problem may well save them some money. It may also surprise them how simple the fix turns out to be'. Fair enough - although having seen round SMC's service department a few years ago I must say I'd be surprised if they couldn't have fixed the problem pretty quickly as well.

That's it for this month - sorry if we couldn't squeeze your request in but QRX till next time and we certainly will. 73 ES GUD DX.

Helplines is designed to help put people in touch with each other. If you have a problem, it's more likely there's someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts; if you have solved a particular problem, write and tell the rest of us. 'Helplines' is there to help you and to give you the opportunity of helping others. Write to us marking your envelope 'Helplines' and we'll do what we can to get the message out.



CLUB NEWS

DEADLINE - Items for inclusion in the MARCH 1990 issue must be sent to HQ marked 'Club News - DIARY', to be received by 22 February latest. If news is received by the published deadline, it will appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

AVON

▶South Bristol ARC - Y, training for VHF Field Day; 14, VHF activity evening; 21, computer activity evening; 28, CW activity evening. Mar 7, committee meeting and Sovereignside TV Repeater Group presentation; 14, HF activity evening. Details Whitchurch 832222 on a Wednesday evening.
▶Weston-Super-Mare RS - 5, talk by Ray Mason on his experiences as a radio operator with the wartime SOE; 19, constructors night; Mar 5, surplus equipment sale; 19, constructors night. Details 0934 514429

BEDFORDSHIRE

▶Bedford & DARC - 6, talk 'Test Night' by Richard, G1ZOJ; 13, social evening; 20, talk 'Limerick HF' by Dennis, G4YYC; 27, social evening; Mar 6, talk 'Old Radios' by Don Underwood, 13, social evening. Details 0234 266443.
▶Stotfold & DARS - 15, visit to Baldock Radio Station; Mar 15, visit to Baldock Radio Station. Details 0Y0Y 3Y221 I

BERKSHIRE

▶Maidenhead DARC - 1, new equipment evening; 20, talk 'Low Frequency DXing' by Don, G3XLT; Mar 1, quiz at home against Reading ARC; 20, AGM. Details Maidenhead 25952.
▶Reading DARC - 22, talk by G4JVG on the Cocos Keeling VK9YG Expedition and the Jersey CQ Worldwide Competition; 24/25, Special Event Station for Guides Thinking Day at Woodley Pavilion; Mar 1, annual quiz competition against Maidenhead Club, at Maidenhead DARC; 8, talk 'HF DXing' by G3XTT

BUCKINGHAMSHIRE

▶Aylesbury Vale RS - Y, surplus equipment sale. Details 0280 817496.

CHESHIRE

▶Macclesfield & DARS - 6, construction; 13, talk 'Measurements in Amateur Radio' by GYEAH; 20, committee and shack night; 2Y, talk 'Present & Future of Satellites & High Definition TV' by C. Muriel. Details 02 605 2028

CLWYD

▶Alyn & Deeside ARS - 'NEW VENUE' British Steel Shotton Works Sports & Social Club, Rowley's Drive, Shotton, Deeside, 8pm, Wednesday evenings.
▶Conwy Valley ARC - 1, talk 'Keyers' by Brian Clark, GW3HGL; Mar 1, quiz. Details 0492 530Y25

CUMBRIA

▶Eden District ARS - 22, construction judging, bring your homebrew gear along; Mar 22, AGM. Details 09312 514

DERBYSHIRE

▶Buxton RAS - 'NEW MEETING DATES' Lawwood Hotel, Buxton, Second Tuesday each month, 8pm. Details G4IHO 0298 25506
▶Derby & DARS - 7, junk sale; 14, illustrated talk 'Underground in Derbyshire's Lead Mines' by John Jones; 21, technical topics; 28, illustrated talk 'North American Travels' by Marita Moss, G4WBK; Mar 7, junk sale, 14, illustrated talk 'Early Radio Pioneers'; 21, AGM. Details 0332 669I5Y.

DEVON

▶Axe Vale ARC - Mar 2, talk 'Satellite Launch from Cape Canaveral, Florida' by Vic, G4KEE.
▶Plymouth RC - 6, talk 'Marine Mobile' by Mike Charlton; 13, activity night, 20, talk 'Archives' by Alison; 2Y, activity night; Mar 6, visit to Plymouth Museum; 13, RSGB video. Details 0752 361842.
▶Torbay ARS - 2,9, club nights; 16, monthly meeting followed by talk 'Filters and Cavities'; 23, club night; Mar 2,9, club nights; 10, annual dinner, Templestowe Hotel; 16, club night. Details 0803 526762

DORSET

▶Plessey Christchurch ARS - 8, junk sale.
▶South Dorset RS - club meeting; Mar 8, club meeting and bring & buy sale.

EAST SUSSEX

▶Hastings E&RC - 21, talk 'Wire Aerials for the Beginner' by G3BDQ; Mar 21, AGM

ESSEX

▶Braintree & DARS - 5, film show 'Caribbean Hot Nights' by John, G3OLO; 19, G3PEN - Completion of Project with 80m TX; Mar 5, talk 'Raydot' by Joe Binning, G3AJS; 19, talk by Astronomical Society. Details 0376 27431.
▶Chelmsford ARS - 6, Chairman's debate; Mar 6, talk 'DF' by Dick Brooks, G3WHR
▶Loughton & DARS - 9, talk 'A Homebrew VHF-HF Converter' by Ray Pedley, G0LWF; 23, any radio questions; Mar 9, talk 'The Versatile Diode' by John Rny, G8DZH. Details 01-508-3434 (after 6pm) 0Y27 59292 ax1n 4611 (office).

GRAMPIAN

▶Aberdeen ARS - 2, junk sale, 9, talk 'Evolution in Handheld Transceivers' by GM1WKR; 16, debate 'There Should be a National Radio Society for Scotland'; 23, talk 'RF Earth and Associated Electrical Safety' by GM0CSZ; Mar 2, junk sale; 9, 'Use of Basic Test Equipment for the Radio Amateur' by various members; 16, talk 'Matching Unit for Wire Antennas' by GM3UU

GREATER LONDON

▶Acton, Brantford & Chiswick ARC - 20, discussion 'Future Club Policy'
▶Biggin Hill ARC - 20, VSWR by Ian Daniels, G4VTD.
▶Coulsdon ATS - 12, RSGB video evening, Mar 12, surplus equipment sale
▶Southgate ARC - 8, talk 'Sporadic E Propagation' by Jim Bacon, G3YLA; 22, club meeting, Mar 8, preparations for the London AR Show; 9&10, The London Amateur Radio Show.
▶Wimbledon & DARS - 9, talk 'Test Your Own Equipment' by Nick, G6AJY, 23, EGM followed by Selection of Videos; Mar 9, surplus equipment sale. Details 01 330 2Y03

GREATER MANCHESTER

▶Eccles & DARS - 6, discussion 'Club Stand at Ilra Norbreck Rally'; Mar 6, talk & demonstration 'Advanced Oscilloscope Techniques' by G8VF
▶Stockport RS - 14, talk 'Magnetic Antennas' by Don Powell, G0FHI; 28, talk 'Antarctica' by Ron Smith, G3SVW, Mar 14, talk 'The GSRV Dipole and its Relatives' by John Verity, G4ECI. Details 061 439 3831.

HAMPSHIRE

▶Andover RAC - 7, Packet Radio demonstration by G0AMO; 21, talk 'Corn Circles' by G1NMT or 'Musical Synthesisers' by G0AMO; Mar Y, quiz night - Andover v Newbery. Details from G6TGZ, 4 Halcyon Drive, Thruxton, Andover.
▶Fareham & DARC - 14, junk sale; 28, talk 'Weather Satellite Pictures' by Bernt, G4EMR, Mar 14, project 'Two Tone Generator' by Rod, G0ERS. Details 0705 32141 I/2 (daytime).
▶Farnborough & DARS - 14, lecture TBA, 28, First Silver Jubilee Special Evening; Mar 14, talk 'Amateur Radio in the USA' by G0IK1400. Details 02Y6 29231 or 0252 519773
▶Horndean & DARC - 1, Brains Trust, Mar 1, talk 'Pallindors' (Part 2) by G3VPO. Details 0Y05 4836Y6.
▶Liphook (Three Counties ARC) - 14, The Solent Fortifications Award; 28, talk 'Astronomy in Hampshire' by Robin Gorman, Mar 14, club night for your own activities

HEREFORD & WORCESTER

▶Bromsgrove ARS - 13, technical topics; 2Y, project night, Mar 13, Dave Howes - C.M Howus, Kit Manufacturers.
▶Bromsgrove DARC - 9, demonstration by 'Badger Bonds' G4YKO; Mar 9, AGM

HERTFORDSHIRE

▶Choshunt & DARC - Y, talk 'Computers, Databases and Examples' by Ian, G4IUZ, 21, talk 'Modifying PMR Equipment for Amateur Bands' by John, G3WFM, Mar 7, talk 'Keyboards, Computers and MIDI' by Alex, G0CZZ
▶Harpenden ARC - 14, informal at the Marquis of Granby, 8pm; 21, talk 'Amateur TV' at the Park Hall, Harpenden, 8pm. Details 0582 713770.
▶Stevenage & DARS - 6, talk 'Psst - Wanna Bey a Rig?' by Toby, G1ZZH, 20, talk 'Band Plans and Squata Basking' by Jny, G3HEA; 2Y, committee meeting at Whomerly Road; Mar 6, AGM, 20, talk 'Which Aerial is Best?' by Peter, G0GTE.

HUMBERSIDE

▶Goole RES - 9, junk sale; 16, HF operating evening; 23, secret evening. Details 0405 69968.
▶Hessea ARC - Y, talk 'Pleasance to Mount Pleasant' by Land Sea and Air by Harry, G7DNN; 14, talk 'QRP Setting Up and Operating' by Dave, G0DEB; 28, open forum; Mar 7, home construction; 14, committee meeting

LEICESTERSHIRE

▶Leicester RS - 5, HF/VHF night on the air; 12, committee meeting and HF/VHF activity night; 19, talk - subject TBA; 26, HF Contest review, HF NFD preliminary planning meeting; Mar 5, quarterly progress, open meeting; 12, committee meeting, HF/VHF activity night.

LOTHIAN

▶Lothian RS - 14&28, TBA, Mar 14, open night.

MERSEYSIDE

▶Wirral ARS - Y, President's night. Talk by G2CVV.
▶Wirral & DARC - 14, discussion night. Any questions answered (if poss!)

NORFOLK

▶Norfolk ARC - Y, 'Real Radio' - club project discussion; 14, talk 'Science for All' by Arnold Tomalin, G3PTB, 21, informal and Project YEAR planning; 28, talk 'Emergency Communications' by Dr. Tim Hirst, G4CTT

NORTH YORKSHIRE

▶Scarborough ARS - 5, surplus equipment sale, 7.30 in Scarborough Cricket Club, North Marine Road.

NOTTINGHAMSHIRE

▶Mansfield ARS - 1, home brew evening - bring your winter project, finished or not, 15, talk by Fire Prevention Officer, Mar 1, junk sale, 15, Linears V Processors V Antennas

ORKNEY

▶Orkney AR Group - 7, slides and tape 'Aurora - What Causes It? Pt 2'; Mar 7, video 'DX pedition to Lord Howe Islands. Details from Alan, GM4IOB or Bill, GM3IBU, both QTHR

SHROPSHIRE

▶Oswestry DARC - 'CHANGE OF CONTACT' Details from Stan Hutton, GI MAB, 'Awelon', Tetaeis Lane, Llynclys, Oswestry, SY10 8LL Tel: 0691 830328
▶Salop ARS - 1, Cam 3 Video 'His British Icelandic Expedition 1989'; 15, talk 'Raynet - How It Operates' by G4IUT; Mar 1, Magnationalist, G3UKV.
▶Telford & DARS - Y, club station on UHF bands.

SOMERSET

▶Mid Somerset ARC - 2, computer link-up between Richard, G0JOV and Basil, G4VVP, 16, talk by Peter, G3RZP, Zonal Council Member, RSGB.
▶Yeovil ARC - 1, discussion night, 8, talk 'Safety in Amateur Radio' by G3GO; 15, Preston school videos; Mar 1, discussion night

SOUTH GLAMORGAN

▶Cardiff RSGB Group - 12, 4 way qsrz Cardiff/Barry/British Telecom/Raynet; Mar 12, talk 'Digital to Analogue Conversion' by J. Caso, GW4HWR

SUFFOLK

▶Felixstowe DARS - 5, annual dinner at The New Gardens Restaurant, Hamilton Road, Felixstowe; 19, home brew contest; Mar 5, talk on frequency measurement 'Do You Know How Fast It's Going?' by Dave Powis, G4HUP (Ferry Boat Inn); 19, AGM

SURREY

▶Dorking & DARS - 13, informal - Falkland Arms; 27, talk 'Contesting - Introduction to Whys and Wherefores' by Garry Hinson, G4IFB, RSGB HF Contest Committee - Ashcombe School, Mar 13, informal - Falkland Arms
▶Shirley & Croydon RS - 16, TBA, Mar 16, constructional contest

WARWICKSHIRE

▶Atherstone ARC - 'CHANGE' Meetings now held on the First Wednesday of each month, commencing at 8pm.
▶Rugby ATS - 13, talk 'The OSL Bureau' by Mr. P. Story, G0BDF; Mar 6, Mr. J.I.Hopwood, G0EDT, RSGB Region 3 Liaison Officer.
▶Stratford upon Avon & DARS - 12, talk 'VHF Antennas' by Derek Bedford, G4ABS; 26, technical topics - Greg Lovelock, G3III, Mar 12, talk 'Satellite Weather Systems' by Leslie Kaye

WEST MIDLANDS

▶Coventry ARS - 'NEW SECRETARY' Neil Blair, G7ASZ, 109/CH3, Cryfield Hall, University of Warwick, Coventry CV4 YAL Tel. 0203 523629 2, night on the air and Morse tuition, 9, quiz night - Neil, G7ASZ; 16, night on the air and Morse tuition, 23, Indoor Direction Finding Contest.
▶Midland ARS - 20, project night; Mar 20, talk 'WAB' by G6OVO (provisional)
▶Solihull ARS - 15, talk 'A Century of Sound Recording' by Brian Hayward, G8VXO.
▶South Birmingham RS - 7, Expedition to St Kilda
▶Stourbridge ARS - 5, on the air; 19, constructors' competition; Mar 5, on the air

WEST YORKSHIRE

▶Halifax & DARS - 20, junk sale/surplus sale; Mar 20, Brkalls Components Sale
▶Keighley ARS - 13, visit Peter Blacks Motor Museum; 20, night on the air G0KRS; 2Y, home construction G3TDZ; Mar 13, talk 'Modifying PMR Gear' by G4FSO. Details Bradford 496222.
▶Northern Heights AR - 7, talk 'Packet Radio Networking' by Alan, G3TQA and Paul, G4GXN, 21, talk 'Physics and Astronomy for Radio Amateurs' by L.M Dougherty; Mar 7, Hi-Fi Update - Paul Allen, G3USH
▶Otley ARS - 6, talk '3cm Pnst and Future' by Peter Blakeborough, G3PYB, 13, night on the air; 20, talk 'Satellites' by Geoff Allonby, G0JGP; Mar 6, talk 'Constructional Techniques' by Rev. G.C. Dobbs, G3RJV; 13, night on the air
▶Pontefract & DARS - 1, AGM; 8, talk by Bnaa, G3SYC; 15, committee meeting/ Components Fair meeting, 22, talk 'The Pennine Way' by Nigel, G0BPK
▶Todmorden & DARS - 6, AGM.
▶White Rose ARS - Y, Rally briefing; 14, quiz night, 21, talk 'SSTV & DXTV' by Bill, GYDHM; 28, talk 'WAB'; Mar Y, Rally briefing; 14, informal evening

WILTSHIRE

▶Blackmore Vale ARS - 13, talk 'Power Supplies' by Steve, GI ZTO; 27, club station on air; Mar 13, AGM

MOBILE RALLIES

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

24 FEBRUARY

▶Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Doors open 10.15am (10am for disabled visitors). Traders, bring & buy, bar, snacks. Talk-in on S22 & SU22. Details from Bob, G0LKE, tel: 0634 382154

25 FEBRUARY

▶The 3rd TAW & Teridge Rally - BAAC Hall, Bideford, Devon. Doors open 10.30am. Trade stands, bring & buy, bar, refreshments. Talk-in S22. Details, G0GFK 023Y2 Y6402

3 MARCH

▶Tyneside ARS Rally - North-Eastern Exhibition Centre, Gosforth Park Race Course, 11 mile north of Newcastle upon Tyne). Doors open 11am. Usual trade stands, Morse tests, bring & buy, refreshments, and ample free parking. Talk-in on S22 and SU8. Details from Terry, G6VEG, tel: 091 264 8196

4 MARCH

▶Trafford Rally - G-MEX, The Greater Manchester Exhibition & Events Centre, City Centre, Manchester. Doors open at 10.30 for all, with priority to any disabled visitors. Admission £1. Usual and new traders. Parking. RSGB stand. Bring & Buy. Morse tests. Refreshments. Licensed bar. Talk-in station (GB1GMX) on S22, 2m. Details from Graham, G1IJK tel 061-748 9804

11 MARCH

▶South Essex ARS Mobile Rally - The Paddocks, Canvey Island, Essex. Starts 10 am. Trade stands, bring & buy etc refreshments. Talk-in (G4RSC) on S22. Details Ken Hendry, G0BBN, tel: 0268 Y55350
▶Welsh Mobile Rally - Barry Leisure Centre, off Heron Road, Barry, South Glamorgan. Details GW6NCK

18 MARCH

▶Norbreck Amateur Radio, Electronics and Computing Exhibition organised by the Northern Amateur Radio Societies Association (NARSA) at the Norbreck Castle Exhibition Centre, Blackpool. Details from Peter Denton, G6CGF, tel. 051 630 5Y90
▶Tiverton RC Mid Devon Rally at the Pannier Market, Tiverton. Doors open at 10.00. Free parking, food & drinks available; club room open all day, talk-in on S22; trade attendance by invitation only. Details from G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon EX16 6RS
▶Wythall Rally - Wythall Park, Silver Street, Wythall, Worcs. Join the A435 near junction 3 on M42, south west of Birmingham). Doors open 11.00am. Usual trade stands, flea market, bring & buy, RSGB Morse test (provisional); bar and snacks; talk-in on S22; admission 50p. Details G0EYO, tel: 021 430 Y267.

25 MARCH

▶Pontefract & DARS 11th Annual Components Fair - Carleton Community Centre, Carleton, Pontefract. Commences 11am; bookstall; bring & buy; licensed bar etc; talk-in on S20; admission free. Details from Mr. B. Senior, 5 Park Close, Darrington Pontefract WF8 3BA, tel; 09YY 70406Y.

1 APRIL

▶White Rose Rally - Leeds University. Details G4DXA, PO Box 73, Leeds LS1 5AR.

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8 APRIL

▶Cambridgeshire Repeater Group Amateur Radio Rally/Junk Sale/Bring & Buy/Auction. Philips Radio Communications · Catering Centre, St. Andrews Road, Chesterton, Cambridge. Doors open 10.30am. Auction items accepted from 9.30am. Details G0HEM (QTHR).

▶Launceston ARS Rally at Launceston College. Doors open 10am. Bar; hot snacks; bring & buy; traders; Morse tests; opinions on your CW progress; RSGB publications on sale; breakfast bar for traders from 8am; parking; talk-in on S22. Details from Maggie on 040921 219 or Rodney & Joy on D566-5167.

▶Swansea ARS Rally · Swansea Leisure Centre, situated on the A4067 Swansea-Mumbles coast road. Doors open 10.30am. Trade stands; bring & buy; repeater groups; demonstration station; bar; refreshments. Talk-in via GB2SWR on S22. Details from Roger Williams, GW4HSH, tel: 0792 404422.

15 APRIL

▶Centre of England AR Rally · Motorcycle Museum, Bickenhill, near NEC Birmingham. Details from Margaret or Frank, G4UMF, tel: 0952 598173.

22 APRIL

▶Marske-by-the-Sea Radio Rally · Marske Leisure Centre, High Street, Marske-by-the-Sea, near Saltburn. Doors open 11a.m. Talk-in on S22. Details from Allen, G7CBR, tel: 0642 480055.

6 MAY

▶7th Anglo Scottish Rally · Tait Hall, Kelso Details from Bruce, GM4UIB, QTHR.

7 MAY

▶Mid Cheshire ARS Rally · Civic Hall, Wmsford Details from David, G4XUV, tel: 0606-77787.

13 MAY

▶Drayton Manor Mobile Rally · Drayton Manor Park, near Tamworth, Staffs. Details from Norman, G8BHE, tel: 021 422 8787

19 MAY

▶Swindon Radio Rally · Oasis Leisure Centre, Swindon, Wilts. Details from Jim, tel: 0793 811859 or John, tel: 0793 619014.

20 MAY

▶Cambridge & DARC 5th Annual Rally and Radio Car Boot Sale at Coleridge Community College, Radegund Road, Cambridge. Details from Brian, G4TRC, tel: 0223 353664.

▶Dunstable Downs RC 7th National AR Car Boot Sale · Stockwood Park, Luton. Details from Clive, G4ENB, tel: 0582 27907.

▶33rd Northern Mobile Rally · The Great Yorkshire Showground, Harrogate. Details from Mike, G0MKK, tel: 0423 564353/507653.

27 MAY

▶14th Annual East Suffolk Wireless Revival 1990 · Civil Service Sports Ground, Straight Road, Bucklesham, Ipswich. Details from Paul Whiting, G4YQC, 77 Mellord Way, Felixstowe, Suffolk, tel: 0473 642595.

▶Plymouth Radio and Electronics Fair · Plymstock School, Church Road, Plymouth. Details from Jan Fisher, G0IVZ, tel: 0752 340946 evenings/weekends.

28 MAY

▶Bircotes Radio Rally · near Bawtry, Doncaster. Booking forms/details 23 Clarence Avenue Balby, Doncaster. Tel: 0302 857526.

3 JUNE

▶British Telecom (S. Wales District) ARS 2nd Annual Radio Rally · BT Headquarters, Coryton, Cardiff. Details from Marilyn Jenkins, GW7EYP, tel: 0222 379634 (office hours).

▶Southend & DARS Mobile Rally at Rochaway Youth Centre, Rochford Essex. Details from John Stone, G0DFE, tel: 0702 202216

▶Spalding & DARS Mobile Rally. Springfields Arena Spalding. Details from T. Kotflewell, G4TWR, tel: 0775 722940.

10 JUNE

▶21st Elvaston Castle Mobile Radio Rally, Elvaston Castle Country Park near Derby. Details from John, G4PZY on 0332 767994.

▶Royal Naval ARS 30th Annual Mobile Rally · HMS Mercury, Nr. Petersfield, Hants. Details 0703 557469.

24 JUNE

▶City of Bristol Group 33rd Longleat Amateur Radio Rally, Longleat Park, Warminster, Wilts. Details Shaun O'Sullivan, G8VPG, tel: 0225 873098.

1 JULY

▶York Radio Rally · Tattersall Building at York Race Course. Details tel: 0904 625798.

15 JULY

▶Sussex AR and Computer Fair · Brighton Racecourse. Details from Ron Gray, G8VEH, QTHR, tel: 0903 763978 or 0273 415654 (office hours)

29 JULY

▶Rugby ATS Amateur Radio Car Boot Sale · venue to be advised. Details from Kevin, G8TWH, tel: 0203 441590.

▶Scarborough ARS Rally · The Spa, Scarborough. Details from Ian, G4UQP, tel. 0723 376847.

12 AUGUST

▶Derby Mobile Rally · Lower Bemrose School, St. Alban's Road, Derby. Details from Kevin Jones, G4FPY, 20 Pinecroft Court, Oakwood, Derby DE2 2LL. Tel: 0332 669157.

19 AUGUST

▶Royal Forest of Dean, Gloucs, Speech House Rally. Details from Terry, G4HZT QTHR, tel: 0594 33334 (mid evenings).

▶West Manchester RC Red Rose Summer Rally · Bolton Sports & Exhibition Centre, Silverwell Street, Bolton. Details from Dave, G1IOC, tel: 0204 24104 (evenings only).

26 AUGUST

▶Torbay ARS Mobile Rally · STC Social Club, Brixham Road, Paignton, Devon. Details G3HTX QTHR.

2 SEPTEMBER

▶Preston ARS 23rd Annual Rally · University of Lancaster. Details from Godfrey, G3DWO, tel: 0772 53810.

9 SEPTEMBER

▶Vange ARS Annual Rally · The Laindon Community Centre, Aston Road, Laindon, Basildon, Essex.

16 SEPTEMBER

▶Bristol Radio Rally · Brunel's Great Train Shed, Temple Meads Station, Bristol. Details from David Farr, G4WUB, tel: 0272 839855.

21 OCTOBER

▶4th North Wales Radio Rally · Abercanway Centre, Llandudno Details from E. Shipton, 34 Argoed, Chester Avenue, Kinmel Bay, Rhyl, Clwyd LL18 5AY, tel: Rhyl 336939.

11 NOVEMBER

▶MARS Birmingham Mini Mobile Rally · Stockland Green Leisure Centre, Erdington, Birmingham. Details from Norman, G8BHE, tel: 021 422 8787.

16 NOVEMBER

▶West Manchester RC Winter Rally at Bolton Sports and Exhibition Centre, Bolton. Details Dave, G1IOC, tel: 0204 24104 (eves only)

OTHER EVENTS

9/10 MARCH

▶London AR Show · Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N9 (just off the North Circular Road). Talk-in on 2m and 70cm. Bars. Restaurants. Disabled facilities. Free parking. Huge exhibition area. Bring & Buy. Dedicated area for Special Interest Groups. Admission £1. For further details and advance ticket sales, phone 0923 678770.

25 MARCH

▶Dover (YMCA) ARC QRP Convention & Table Fair · Dover YMCA ARC, Dover. Opens 10.30. Details from G0BPS, tel: 0303 276171

1 APRIL

▶IARU Region 1 Conference starts · Torremolinos, Spain. Details G3FKM.

21/22 APRIL

▶RSGB National Convention · NEC Birmingham. Details 0277 225563.

29 APRIL

▶Bury RS 1990 Hamfest · Castle Sports Centre, Bolton St, Bury. Doors open 11am, for disabled and blind visitors at 10.30am; talk-in on S22 and SU8; traders; catering facilities; giant 'Bring & Buy'. Details from C.D.W. Marcroft, Mossas Community Centre, Cecil St, Bury, tel: 0706 229930 (evenings only)

6 MAY

▶BATC Convention, Harlaxton Manor, Nr. Grantham. Details from Paul Marshall, G8MJW; tel: 0522 703348

12 MAY

▶RSGB VHF Convention · Sandown Park Racecourse. Details from Geoff Stone, G3FZL, tel: 01 699 6940.

13 MAY

▶Yeovil ARC 6th QRP Convention · Preston Centre, Monks Dale, Yeovil, at 8am with the first lecture at 10.30am. Lectures during the day by GM3OXX, G3RHI, G3PCJ, G3MYM. All usual traders. Food & drink. Further details from GI MNM, QTHR · by post only.

17JUNE

▶Eighth Annual Practical Wireless 144MHz QRP Contest. 0900 - 1700 UTC. Transmitter output power will be limited to 3 watts as usual. Full rules will be published in due course in *Practical Wireless*. Contest adjudicator; Neill P. Taylor, G4HLX.

the last...

QSL BUREAU

Reading the 'QSL Bureau Gripes' in the January copy of *RadCom*, I was not at all amused to read GI SGB's attack on Ted Allen.

Here we have a chap who gets all his QSLs despatched · assuming he sends any · at no cost to himself, by the very man he sets out to attack who has given years of valuable service to the QSL Bureau both as a sub-manager and now as manager.

In the 27 years that I have been handling a section of the Bureau I have only once had to deal with a person of similar views. He wrote complaining to Ted Allen over having not received any cards from me for about 9 months. His letter was forwarded for me to deal with. Upon checking my stock of SAEs I found this person had no envelopes deposited with me, I wrote to him informing I had some cards for him which I would be pleased to send if he would send me some envelopes. But he never did!

So, when a person complains of 'lack of efficiency' he should first make certain that he himself is efficient. For example:

(1) Has he supplied his sub-manager with some SAEs?

(2) Is the postage on them up to date?

(3) Are the envelopes of suitable size? (About 7 x 5 in.)

As regards G1SGB's sweeping statement that the sub-managers put in more cards than the postage will allow, all I can say is that I have a set of letter scales, and I check each envelope for weight before posting them.

J H Brazzill, G3WP

May I refer to the letter from S G Bryan, GI SGB, published in your January issue? Since this mentions me by name, I trust you will permit me to reply in some detail as it contains much incorrect information and false assertions.

The facts being as follows:

He first contacted the Bureau some time ago with the fixed idea that there should be more than one sub-manager for the G1 callsign group, this not being borne out by the facts any more than it was for the G6 and G7 groups. He did not of course give any valid reason, so no action was taken beyond pointing out the position to him.

He then took another tack and criticised the system, alleging that his group was being discriminated against. Again, no facts or supporting complaints.

I advised him that the G1 group received exactly the same treatment as all the others and that all sub-managers had, according to my records, received a parcel of cards, on average every 35 days for the past three years.

The next I heard was when the G1 sub-manager passed me a letter from GI SGB saying that he did not believe it, although goodness knows why anyone would want to tell lies over it.

Now we come to this gentleman's reference to my being sent cards in June. Like many people I take my annual holiday in one spell. Although this is up to the individual, most members co-operate by not sending cards during that period, which is announced in *RadCom* and on GB2RS. Mr Bryan was one of those who either did not see or act upon our request. I know he knows little about the Bureau, but even he should appreciate that a husband and wife team do not want 48-plus bags of mail awaiting their return from holiday.

Now the true facts concerning the eventual transfer of the QSL Bureau to Potters Bar. The Bureau is not being transferred because many amateurs are constantly criticising the Bureau (certainly not in writing to me or to Potters Bar). The real position is that by every post I receive notes of appreciation over the service given, not to mention Christmas cards.

I reached the age of 65 in June 1988, but agreed to carry on for a further period until such time as HQ took over. Improved radio conditions were adding to the workload all the time (not to mention new bands) so it was arranged that in June 1989 the incoming portion of the Bureau would be transferred to Potters Bar, including a large backlog as a result of the earlier Post Office strike. Our official 'holiday' period was largely spent in assisting this move, but obviously one cannot make such a change overnight. Once again the position was outlined in *RadCom* quite adequately, I thought. Since we were officially on holiday, no cards would have been sorted that month anyway. The system did not crash, there was merely an unavoidable, though planned, delay whilst a transfer was being organised.

E G Allen, G3DRN
Outgoing RSGB QSL Bureau Manager

HOW USEFUL IS CW?

What a pleasure it was to read G4OZL's letter in the January 'Last Word'. No doubt it will bring howls of derision from those with superiority complexes, but it is good to see a constructive suggestion which, as we approach the year 2000, views CW in a less parochial way.

I have never been able to see why a CW test before sending CW was any more important than a typing test before sending RTTY.

I believe that the only official reason the CW test still exists is to limit the numbers on the already overcrowded HF bands. In this day and age the so-called 'life and death situations' which might require an amateur to read CW are highly unlikely to occur since most professional communicators left CW behind long ago.

G4OZL seems to have got things in the correct perspective. The thing that obviously counts is the RAE; this is the only point where the amateur's ability to operate the equipment is tested. It is logical that the novice licence should permit low power outputs to allow all potential amateurs to gain experience to go on to take the RAE where they can prove their competence. After this, with an 'A' licence, they would be able to use full power.

To argue that a sinking ship sending SOS might stray from 2182 on to topband or eighty is no different to the chance of finding 'flight 19' on two metres. (I can't copy AM either.)

May I completely endorse G4OZL's view but suggest that there be two licences, an 'A' licence a novice licence. Let those who choose not to use CW go in peace. There should be no further restriction on mode or frequency for beginners, only power. For those who like to carry on the tradition please feel free.

So come on RSGB, get ready for the 21st century, not a restart of the 20th! Make this your goal for the 1990s.

G Lindsay, G8BZL

MORE ON THE NOVICE LICENCE

I can assure Roland Blade ('Last Word', January) that the RSGB has actively pursued a form of Novice Licence for some considerable time with regular reports of progress appearing in *RadCom*, particularly during the past twelve months.

I can also assure him that the RSGB did not adopt a hostile approach to CB; in fact positive steps were taken by the Society to encourage them to take an active part in amateur radio · a policy that has been very successful.

I am pleased that James changed his attitude to amateur radio after failing the RAE and I do wish him every success in his future examinations to obtain a full call.

Finally it was ironic that the writer should have given James his first QSO using his brand new Novice call - VK2VJB!

John Bazley, G3HCT
Chairman, Licence Advisory Committee

Over the past few months there have been a number of letters discussing the proposals for a novice licence. Very few of these have been written by class B operators.

As a class B operator, I must disagree with Mr P Ingram, G4OZL, in his comments that a class B licensee would be 'incensed' with the thoughts of a novice licence. I still find plenty to interest me on the VHF bands and I am pleased that the RSGB are proposing the novice licence; our hobby needs a continuous influx of new members and anything that helps this must be welcomed.

If the proposed novice licence does allow some operation on the HF bands, then some class B licensees may be encouraged to apply for one and discover what the HF bands have to offer. In this way it can be used as a stepping stone to a class A licence.

The excellent Bairdstown experiment showed what can be achieved in getting new members interested in amateur radio. To be able to repeat that in this country, then we need a means of getting new members on the air (even in a limited form) without examinations or tests being seen as a stumbling block and putting them off. Once they have seen the delights of our hobby, then their enthusiasm will carry them through the examinations for the full licence.

Phil Walter, GM8SNE

SHAMBOLIC SHACK DISAPPOINTMENT

To my humiliation of coming third in the 'Shambolic Shack' competition, you now add disappointment by denying me my eagerly awaited spoils in time. I was so looking forward to receiving my apron before the New Year as it would have had a profound effect on one of my resolutions!

It appears that Mr Kemp, G4TLK, (January 'Last Word') was convinced that the competition was as serious a matter as the safety in my radio room. Just because the area appears to be a shambles doesn't mean that it is dangerous. Does he use a 'robust' external earthing system and employ ELCBs together with interlocks on all high voltage equipment? Is his main breaker located in such a position that it is very easily accessible? I have all these and I bet many other of the entrants do too.

George Eddowes, G3NOH

FROM THE GDR

With pleasure I read the May issue of *RadCom*. I got it by chance with the friendly help of GM4SVM, Don, from Stirling who sent it to me. And perhaps I'll be allowed to contribute two items.

I'd like to congratulate 11 year old Joanne Bedford for taking her exam at Dover. Mrs M Bedford writes (p.82) that self-motivation and hard work are necessary to get results. That's true indeed. I myself am 48 and I have been on the air for only three years. I passed my exam after taking part in an evening CW sandwich course which was transmitted via our district repeater Y21E every Thursday and lasted for about 6 months.

Then I sat for the exam that consists of a mixed text, letters, figures, standard QSO phrases and idioms. But I think besides self-motivation you should have a good deal of learning methods and techniques which ensure the procedure and the results, e.g. listening to tapes in different ways, copying given texts which you know before and some which you don't know, keying simultaneously, increasing the speed - not too fast! - making breaks at the right moment to avoid interference of similar sounds, combing sounds etc. It's worth discussing teaching methods and learning methods, I think. Hopefully these lines will also provide encouragement to beginners and to those who are ready to give up.

I include a brief mention to the note at page 25, DXnews, Y88POL is not at Volker Base as you wrote. I think it's a typo error. The operator of the above call is Y24LN whose name is Volker. He worked from March 88 to March 89 with the special call from the Arctic station 'Georg Forster' which was installed by the GDR. The location is 46°11'S and 11°50'0E in the Schirmacher Oasis on Queen Maud Country. I got the info from the November issue of our *Funkamateur* paper.

Some last remarks. With interest I have heard about the YEAR project of your DTI and the novice licence. Very interesting indeed! Hams from the UK told me about that. I really want to get more info on these topics.

In my town Schwedt in the north east of my country we have an active group of hams, some very experienced DXers. In December I am going to start a 4-part broadcast 'English for Radio Amateurs' from my club station via the repeater. I hope it will give help for using English on the bands. So I look alot of words, phrases and ideas from your May paper which will help me to improve and increase my stock of words. Well, I thank you for your work and ask you to give my best wishes and 73s to all friendly amateurs in the UK who are always welcome on my frequency.

Dieter Klaschka, Y41BE

VISITING BULGARIA

On the 8th December 1989 I paid my second visit to the City Students Amateur Radio Club in Sofia, Bulgaria. Their callsign is LZ1KDP, I was again made a guest operator at their station. Their equipment is a Kenwood 830 followed by an 800 watt linear feeding a 6 element antenna system. I received a very warm and friendly visit as on my previous visit in February 1987. In February 1987 I also visited a Bulgarian Federation of Radio Amateurs and was again allowed to use their equipment and callsign followed by my own, GW4HA.

They would like to extend a warm and friendly welcome to any British amateur visiting their city. The address of the Federation is 76a Gurko St., Sofia, Bulgaria. During that visit they presented me with a pennant to commemorate their 60th birthday.

T J Parker, GW4HA

G-PLATE AD

I can think of no better way of advertising the fact that one is a radio amateur with valuable radio gear in the car than by having a personalised number plate. I am quite happy to remain, Yours Sincerely, BNJ81K.

A R Hobden, G3YNN

SATISFIED CUSTOMER

A few months ago, I bought an iambic keyer from Kanga Products. The kit came promptly, worked first time, and I was very pleased with it.

Recently, the keyer developed an intermittent fault and I sent it back for advice. By return came a long and helpful letter. When a similar fault appeared again, Kanga at once sent me a replacement kit and refused to accept the cheque I had sent them to cover their postage and expenses.

I have no connection with the firm except as a satisfied customer, but I think their excellent service deserves to be widely known.

John McNaught, G3UJZ

VERBOSE CW OPERATION

I agree entirely with the letter by G4LJF (November 'Last Word'). Could I also make some comments regarding CW operation on the HF bands please?

1. Is it just me, or do other people suffer the irritation of your own transmission being sent back to you? 'Tnx for 589 tpi Im North Bucks. yr Icom 745 es 4 el yagi doing lb job. Yr wx 14C sunny and cool lb di om.' (Imagine living in a 16 letter QTH with a Smorgasbord TX and Circumflexial Rhombic!)

2. The letter R is sufficient to tell the other station that *you have received his last transmission entirely*, and does not require further elaboration. 'Solid copy', 'yr xmsn rcvd ok', 'copied 100pc' can all be replaced with *three symbols* .. dit dah dit.

3. 599 means R5, S9, T9. You cannot have 599 and ask for repeats. QRM, QRN, QRQ or QSD are the major reasons for requesting repeats. If you suffer from the first two, then your report should be 499 or 399. A simple 'pse QRS' should suffice for the speed merchant, whilst you need bags of diplomacy for the QSD complaint! Even 519, or 509 are perfectly acceptable if you are an avid S-meter reporter.

4. DX stations and contest stations now send 599 regardless of true, actual RST. It's assumed to be a quicker way of feeling off a report, 5NN being the method used. (Why not replace the 5 with a single E and be even more correct?). If it is so meaningless, then surely it's a waste of time sending it in the first place.

5. How long does it take to say goodbye? How long is a piece of string? 'Mni tnx for QSO, best 73 to you es yr family, good DX and best wishes, hope cu agn sn, QSL sure via bureau, will look fwd to next QSO further down the log, very best 73s es 88s, good luck...' etc, etc, etc! How many times have you sat on a QSO, patiently awaiting your turn, and listened to all that? Any one of the above would be more than sufficient. There are enough articles written concerning 73s and 88s, so I will not comment further on those.

There are a lot of newcomers on CW and they seem to be increasing. Good! But let us all please be sure to set them a good example. There are also lots of foreign radio amateurs who like to improve their English by using CW. Fine, but please *talk* to them; don't just go back with standard rubber stamp phrases. They will benefit, and so will you.

Des Shepherd (C.Eng, MIEE), G3LCS

Please note that the views expressed in 'Last Word' are not necessarily those of the RSGB.

We reserve the right to edit letters and regret that we can no longer acknowledge them individually but will pass them on to the relevant department.

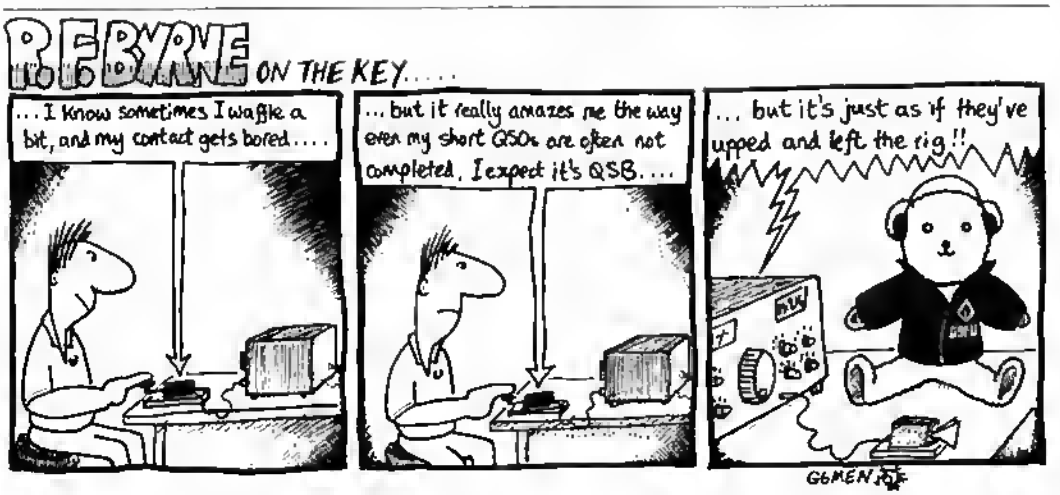
G3TSO TRANSCEIVER

I notice that from the last two issues of *RadCom* that you are advertising a PCB service to readers for some recent constructional projects. I realise that these are all supplied by Badger Boards, rather than the RSGB itself.

As you are aware I undertook to have PCBs manufactured for the 'Modular Transceiver' article and to date have supplied 116 complete sets. I still have a number of sets available and can obtain further supplies should the demand continue.

I would be pleased if you could make it known to readers that these boards are also still available at a cost of £35 for the complete set of 7 PCBs, including postage. Whilst I cannot afford to hold large stocks, I can continue to supply them as long as I receive sufficient orders to justify a minimum quantity production run of 10 sets. I regret that due to the method of construction, individual boards are not available.

Mike Gnerson, G3TSO



...word

INDEX TO ADVERTISERS — FEBRUARY

UK AMATEUR RADIO FREQUENCY ALLOCATIONS AND LICENCE SCHEDULE 1990

Amateur Radio Band Plans

On all bands there are recommended sections set aside for use by each mode. In some parts of the world (e.g. the USA) observance of these band sub-divisions is mandatory. The IARU Region 1 hf band plan is set out below and should be observed at all times even though its recommendations are only advisory as far as UK amateurs are concerned. The IARU Region 1 Conference in April 1990 at Torremolinos may result in some changes being made to these band plans. Any such changes will be publicised in *Radio Communication* at the earliest opportunity.

1.8MHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
1.810							
CW only			Available on the basis of non-interference to other services (inside or outside the United Kingdom)	(Not allocated)	9dBW	15dBW	Morse Telephony RTTY Data Facsimile SSTV
1.840	1.840 ±2kHz	*rtty*					
CW and phone	1.850	*used by QRP*					
2.000							

Callsign	Location	Frequencies (kHz)
GNI	Niton IoW	1834
GNK	Norwick, Shetland	1824
GPK	Portpatrick	1883
GHD	Hebrides	1866
GKR	Wick	1827, 1922'
GND	Stonehaven	1856w, 1946, 1999'
GCC	Cullercoats	1838, 1953w
GKZ	Humber	1869, 1925(w)
GNF	N. Foreland	1848
EJM	Malin Head	1841w
EJK	Valentia	1827w
OST	Ostende	1817w, 1820w, 1905, 1908, 1971.5'
OSA	Antwerpe	1901w, 1904
PCH	Scheveningen	1862w, 1890w,1919.5', 1939w (1971), 1972.5', (1995)
DAN	Norddeich	1911
DAO	Kiel	1880, 1883, 1915, 1918
OXB	Blavand	1813
FFU	Brest	(1894), (1995)
FFO	St Nazaire	1817, (1995)
FFC	Boideaux	1820, 1862w
FFM	Marseilles	1906w, 1988
TKM	Grasse	1834, 1988

The 1.8MHz band is shared with other services. This is a list of coastal radio station frequencies which are to be avoided.

All frequencies are used for ssb, except those marked with an asterisk (rtty) apart from those in brackets, which are available when required, they are all in regular use. "W" indicates a working frequency.

In addition to these, 1950 and 1953kHz, both J3E/USB, are assigned to all UK coastal radio stations. The frequencies which tend to suffer interference from stations in the amateur service are 1,820, 1,841, 1,852 and 1,953kHz, with the last being by far the most commonly affected.

IARU: Band Plan co-ordination

As the RSGB represents the interests of radio amateurs within the UK, so the International Amateur Radio Union (IARU) represents amateur radio on an international scale. Its membership is made up of national societies rather than individuals and it has 124 member societies. It was founded in 1925 and has its headquarters in the USA. It is split into three sections as is the International Telecommunications Union (ITU). Region 1 comprises the UK, Europe, Africa and the USSR.

The aim of the IARU is to promote worldwide growth in the movement and where necessary represent the movement's interests at the ITU. It also regulates and co-ordinates band plans, and makes recommendations for the use in operation of specialised activities such as meteor scatter.

Another service provided is the Monitoring Service (IARUMS) which monitors unauthorised transmissions by other services within the amateur bands. Reports from the IARUMS are sent to both the ITU and national telecommunication administrations.

3.5MHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
3.500							
CW only	3.500 – 3.510	*reserved for international working*	Primary. Shared with other services	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
	3.500 – 3.560	*contest preferred segment*					
	3.560	*used by QRP cw*					
	3.588	*used by AMTOR*					
	3.590 – 3.600	*used by packet radio shared with cw/rtty*					
3.600	3.600 ±20kHz	*rtty shared with cw/phone*					
CW and phone	3.600 – 3.650	*contest preferred segment*					
	3.605	*packet radio BBS*					
	3.635 – 3.650	*used by USSR stations for intercontinental working*					
	3.690	*used by QRP ssb*					
	3.700 – 3.800	*contest preferred segment*					
	3.735 ±5kHz	*SSTV recommended*					
	3.775 – 3.800	*reserved for intercontinental working*					
3.800							

7MHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
7.000							
CW	7.030	*used by QRP cw*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
7.040	7.040 ±5kHz	*rtty and SSTV shared with cw/phone*					
CW and phone	7.070 7.090	*used by QRP ssb UK* *used by QRP ssb international*					
7.100							

10MHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
10.100							
CW	10.106	*used by QRP cw*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
10.145							
RTTY (shared with CW)							
10.150							

Notes: No contests should be organised on the 10MHz band. Credit for awards or diplomas should be accepted for contacts made on the 10MHz band. SSB may be used on the 10MHz band during emergencies involving the immediate safety of life and property, and only by stations actually involved in the handling of emergency traffic.

14MHz	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
14.000							
CW	14.000 – 14.060	*contest preferred segment*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
	14.060	*used by QRP cw*					
14.070							
RTTY (shared with CW)	14.075	*used by AMTOR*					
	14.089 – 14.099	*used by packet radio*					
14.099							
	14.099 – 14.101	*reserved for International Beacon Project (packet radio operators are asked to take special care to avoid causing interference in this segment)*					
14.101							
CW and phone	14.103	*packet radio BBS*					
	14.125 – 14.300	*contest preferred segment*					
14.250							
CW and phone	14.230 ±5kHz	*recommended for SSTV*		(Not allocated)			
	14.285	*used by QRP ssb*					
	14.345	*used by VHF net*					
14.350							

18MHz

UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
	Amateur Service	Amateur Satellite Service	Carrier	PEP	
18.068					
CW					
18.100					
CW and RTTY	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
18.110					
CW and phone					
18.168					

21MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
21.000						
CW	21.060 *used by QRP cw* 21.100 ±20kHz *rtty shared with CW* 21.103 *packet radio BBS* 21.107 *packet radio BBS* 21.100 – 21.120 *packet*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
21.149	*reserved for International Beacon Project*					
21.151						
CW and phone	21.285 *used by QRP ssb Europe* 21.340 ±5kHz *recommended for sstv* 21.385 *used by QRP ssb USA*					
21.450						

24MHz

UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
	Amateur Service	Amateur Satellite Service	Carrier	PEP	
24.890					
CW					
24.920					
CW and RTTY	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
24.930					
CW and phone					
24.990					

28MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
28.000						
CW	28.060 *used by QRP cw* 28.120 – 28.150 *packet radio* 28.123 *packet radio BBS* 28.127 *packet radio BBS* 28.190 – 28.300 *reserved for International Beacon Project (to end 1990)* 28.190 – 28.225 *reserved for beacons (from end 1990)*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
28.200	28.100 ±50kHz *rtty shared with cw*					
CW and phone	28.680 ±5kHz *recommended for sstv* 28.885 *used by QRP ssb* 29.250 ±50kHz *packet radio NBFM* 29.300 – 29.550 *reserved for Satellite service downlink*					
29.700						

50MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
50.000						
CW only	50.020 – 50.080 *Beacons* 50.090 *centre of cw activity*	Primary. Available on the basis of non-interference to other services outside the United Kingdom. Antennas limited to 20 metres above ground level, with horizontal polarisation only. No Mobile or Maritime Mobile operation	(Not allocated)	14dBW erp	20dBW erp	Morse Telephony RTTY Data Facsimile SSTV
50.100						
All narrow band modes	50.110 *Intercontinental calling* 50.100 – 130 *SSB dx* 50.185 *cross-band ssb calling* 50.200 *ssb calling* 50.300 *cw ms ref. freq.* 50.350 *ssb ms ref. freq.*					
50.500						
All modes	50.600 ± *rtty (fsk)* 50.630 *packet radio* 50.650 *packet radio* 50.670 *packet radio* 50.690 *packet radio* 50.710 *packet radio* 50.730 *packet radio* 50.750 *packet radio*					
51.000						
Pacific DX window		Secondary. Available on the basis on non-interference to other services outside the United Kingdom. Antennas limited to 20 metres above ground level, with horizontal polarisation only. No Mobile or Maritime Mobile operation				
51.100						
All modes	51.410 – 51.590 *FM telephony* 51.510 *FM calling*					
52.000						

70MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
70.000						
Beacons only		Secondary. Available on the basis on non-interference to other services outside the United Kingdom	(Not allocated)	16dBW	22dBW	Morse Telephony RTTY Data Facsimile SSTV
70.075						
CW only						
70.150						
SSB and CW only	70.200 *SSB calling frequency*					
70.260						
All modes	70.260 *National mobile and calling frequency* 70.300 *RTTY calling frequency* 70.3250 *packet radio* 70.350 – 70.400 *Raynet*					
70.400						
FM simplex only	70.450 *FM calling frequency* 70.4875 *packet radio*					
70.500						

144MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
144.000						
CW only	144.000 – 144.025 Moonbounce 144.050 CW calling frequency 144.100 MS cw reference frequency					
144.150						
SSB and cw only	144.250 Used for GB2RS (ssb) and slow morse transmissions 144.260 Used by Raynet 144.300 SSB calling frequency 144.400 MS ssb reference frequency					
144.500						
All modes non-channelised	144.500 SSTV calling frequency 144.600 rtty calling frequency 144.600+ rtty working (fsk) 144.625 packet radio 144.650 mailboxes 144.675 packet radio 144.700 FAX calling frequency 144.750 ATV calling and talkback 144.775 Raynet 144.800 Raynet 144.825 Raynet					
144.845						
Beacons	144.850 Raynet*					
144.990						
FM repeater inputs	145.000 R0 145.025 R1 145.050 R2 145.075 R3 145.100 R4 145.125 R5 145.150 R6 145.175 R7	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV
145.200						
FM Simplex channels	145.200 S8 Raynet 145.225 S9 Used by Raynet 145.250 S10 Used for slow morse tone modulated transmissions 145.275 S11 145.300 S12 RTTY afsk 145.325 S13 145.350 S14 145.375 S15 145.400 S16 145.425 S17 145.450 S18 145.475 S19 145.500 S20 FM calling channel 145.525 S21 Used for GB2RS (fm) broadcast 145.550 S22 Used for rally/exhibition talk-in 145.575 S23					
145.600						
FM repeater outputs	145.600 R0 145.625 R1 145.650 R2 145.675 R3 145.700 R4 145.725 R5 145.750 R6 145.775 R7					
145.800						
Satellite service						
146.000						

Notes on UK 144MHz and 430MHz Band Plans

MS operation can take place up to 26kHz higher than the reference frequency (see RSGB *Amateur Radio Operating Manual* p80).

The beacon and satellite service must be kept free of normal communication transmissions to prevent interference with these services. (* – 144.850MHz in use by Raynet until further notice, subject to 25W erp max and vertical polarisation).

The use of the fm mode within the ssb/cw section and cw and ssb in the fm-only sector is not recommended.

Repeater stations are primarily intended as an aid for mobile working and they are not intended to be used for dx communication. FM stations wishing to work dx should use the all-modes section, taking care to avoid frequencies allocated for specific purposes.

430 – 440MHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
430.000						
		Secondary. Not available for use within the area bounded by: 53°N 02°E, 55°N 02°E, 53°N 03°W and 55°N 03°W		10dBW erp	16dBW erp	
431.000						
		Secondary. Not available for use: a) within the area bounded by: 53°N 02°E, 55°N 02°E, 53°N 03°W and 53°N 03°W; b) within a 100km radius of Charing Cross, London (51°30'30"N, 00°07'24"W)				
432.000						
CW only	432.000 – 432.025 *Moonbounce* 432.050 *cw centre of activity*					
432.150						
SSB and CW only	432.200 *SSB centre of activity* 432.350 *microwave talk-back*					
432.500						
All modes non-channelised	432.600‡ *rtty (fsk)* 432.625 *packet links* 432.650 *packet links* 432.675 *packet radio* 432.700 *FAX calling frequency*					
432.800						
Beacons		Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
433.000						
FM repeater outputs In UK only	433.000 RB0 433.025 RB1 433.050 RB2 433.075 RB3 433.100 RB4 433.125 RB5 433.150 RB6 433.175 RB7 433.200 RB8 433.225 RB9 433.250 RB10 433.275 RB11 433.300 RB12 *rtty and voice* 433.325 RB13 433.350 RB14 433.375 RB15					
433.400						
FM simplex channels	433.400 SU16 433.425 SU17 433.450 SU18 433.475 SU19 433.500 SU20 *FM calling channel* 433.525 SU21 433.550 SU22 *Used for rattly and exhibition talk-in* 433.600 SU24 *rtty afsk* 433.625 *packet radio* 433.650 *packet radio* 433.675 *packet radio* 433.700 *Raynet* 433.725 *Raynet* 433.750 *Raynet* 433.775 *Raynet*					
434.600						

continued on next page

430 – 440MHz

continued from prev. page

	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
434.600							
FM repeater inputs in UK only	434.600 RB0 434.625 RB1 434.650 RB2 434.675 RB3 434.700 RB4 434.725 RB5 434.750 RB6 434.775 RB7 434.800 RB8 434.825 RB9 434.850 RB10 434.875 RB11 434.900 RB12 434.925 RB13 434.950 RB14 434.975 RB15	*rity and voice*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
435.000							
Satellite Service	434 – 440	*ATV — frequencies chosen so as to avoid interference to other band users and, in particular, the amateur satellite service*		Secondary			
438.000							
				(Not allocated)			
440.000							

1,240 – 1,300MHz

	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
1,240.000							
All modes	1,240.150 1,240.300 1,240.450 1,240.600 1,240.750	*packet radio (150kHz b/w)* *packet radio (150kHz b/w)* *packet radio (150kHz b/w)* *packet radio (150kHz b/w)* *packet radio (150kHz b/w)*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
1,241.100							
ATV							
1,251.500							
All modes	1,258.150 – 1,259.350	*R20 – R36 repeater output*					
1,260.000							
Satellite service				Secondary. Earth to space only			
1,270.000							
ATV							
1,286.000							
All modes c)							
1,291.000							
Repeater input	RM0 RM19	*(UK) 25kHz spacing*		(Not allocated)			
1,291.475							
1,291.500							

continued on next page

1,240 – 1,300MHz

continued from prev. page

	UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
1,291.500							
All modes	1,293.150 to 1,294.350	*R20 – R36 repeater input*					
1,296.000							
CW	1,296.000 – 1,296.025	*Moonbounce*					
1,296.150							
SSB Narrow band DX segment a)	1,296.200	*narrow-band centre of activity*					
	1,296.500 – 1,296.600	*linear transponder input*					
	1,296.600 – 1,296.700	*linear transponder output*					
1,296.800							
Beacons exclusive b)	1,296.500	*SSTV*					
	1,296.600	*rtty*					
	1,296.700	*FAX*					
1,296.990							
			Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
1,297.000							
Repeater output	RM0 – RM19	*(UK) 25kHz spacing*					
1,297.475							
1,297.500							
FM simplex d)	SM20 – SM30						
1,298.000							
All modes		*digital communications*					
1,298.500							
	1,299.000	*packet radio (25kHz b/w)*					
	1,299.425	*packet radio (150kHz b/w)*					
	1,299.575	*packet radio (150kHz b/w)*					
	1,299.725	*packet radio (150kHz b/w)*					
1,300.000							

UK extends to 1,325MHz.

Notes on the 1,240 – 1,300MHz Band Plan

1. IARU Region 1 Band Plan
The following notes are part of the provisional IARU Region 1 band plan, adopted at the IARU Region 1 conference in Celalu (1984), and all member societies should strongly promote adherence to the recommendations made in these notes.

1.1 Footnotes
a. CW is permitted over the whole narrow-band dx part of the band; cw exclusive between 1,296 000 – 1,296,150MHz.
b. Regional planning by the Beacon Co-ordinator only for beacons with more than 50 Watts ERP.
c. DARC draws attention to the fact that in order to avoid interference to/from primary users the use of 1,286 – 1,291 MHz for atv will be continued in The Federal Republic of Germany.
d. In countries which do not have access to 1,298 – 1,300MHz (e.g. Italy) the fm simplex segment may also be used for digital communications, if necessary.

1.2. Miscellaneous agreements
At the IARU Region 1 conference in Warsaw (1975) it was recommended that France, after their loss of the upper part of the band to other services, adopt the portion 1,238 – 1,240MHz for narrow-band operations in the same way as the rest of Region 1 uses the 1,296 – 1,298MHz segment of the band.

2. Usage
The following notes are referring to the usage column in the band plan. In the right amateur spirit operators should take notice of these agreements which are made for operating convenience, but no right to reserved frequencies can be derived from a mention in the usage column or from the following notes.

2.1 During contests and band openings local traffic using narrow-band modes should operate between 1,297 – 1,298MHz.

2,320 – 2,450MHz

UK Band Plan			Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
2,300.000							
Sub-regional (National band plans)	2,310.100 2,310.300	*packet radio (200kHz b/w)* *packet radio (200kHz b/w)*					
2,320.100							
CW exclusive	2,320.000 2,320.025	*EME* *(Moonbounce)*					
2,320.150							
CW & SSB	2,320.200	*SSB centre of activity*					
2,320.800							
Beacons exclusive							
2,320.990							
2,321.000							Morse Telephony RTTY Data Facsimile SSTV FSTV
Simplex & repeaters (FM)			Secondary	(Not allocated)	20dBW	26dBW	
2,322.000							
All modes	2,322 – 2,355 2,355.100 2,355.300 2,364.000 2,365 – 2,370 2,370 – 2,390	*ATV* *packet radio (200kHz b/w)* *packet radio (200kHz b/w)* *packet radio (1MHz b/w)* *repeaters* *ATV*					
2,390.000							
		EME (Moonbounce)					
2,392.000							
All modes							
2,400.000							
Ameteur satellite service			Secondary. Users must accept interference from ISM users	Secondary. users must accept interference from ISM users			
2,450.000							

Notes on the 2,300 – 2,450MHz Band Plan

a) In countries which do not have access to the ALL MODES against 2,322 – 2,390MHz, the FM SIMPLEX & REPEATER segment 2,321 to 2,322MHz may be used for digital data transmissions.

b) In countries where the narrow-band segment 2,320 – 2,322MHz is not available, the following alternative narrow-band segments can be used: 2,304 – 2,306MHz and 2,308 – 2,310MHz.

ISM (Industrial, Scientific and Medical).

3,400 – 3,475MHz

UK Band Plan			Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
			Amateur Service	Amateur Satellite Service	Carrier	PEP	
3,400.000							
All modes							
3,456.000							
Narrow band CW/EME/SSB	3,456.200 3,456.800 – 3,457.000	*centre of activity* *beacons*	Secondary	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
3,456.000							
All modes							
3,475.800							

5,650 – 5,850MHz

UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
	Amateur Service	Amateur Satellite Service	Carrier	PEP	
5,650.000					
Amateur satellite service (up-link)	Secondary	Secondary. Earth to Space only	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
5,670.000					
All modes					
5,680.000					
All modes					
5,760.000					
Narrow-band CW/EME/SSB	5,760.200 *centre of activity* 5,760.800 – 5,761.000 *beacons*	(Not allocated)			
5,762.000					
All modes	Secondary. Users must accept interference from ISM users				
5,830.000					
Amateur satellite service (down-link)		Secondary. Users must accept interference from ISM users. Space to Earth only			
5,850.000					

10,000–10,500MHz

UK Band Plan	Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
	Amateur Service	Amateur Satellite Service	Carrier	PEP	
10,000.000					
All modes (ATV, data transmission, FM simplex, duplex and repealers)	10,006 – 10,026 *packet radio* 10,100 *wide band beacons* 10,150 – 10,170 *packet radio*	(Not allocated)	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
10,368.000					
Narrow-band CW/EME/SSB/ Beacons	10,368.200 *SSB centre of activity* 10,368.800 – 10,369.000 *narrow band beacons*				
10,370.000					
All modes	10,400 *wide band beacons*				
10,450.000					
Amateur and amateur satellite service (all modes)	Secondary	Secondary			
10,500.00					

Notes on the 10,000 – 10,500MHz Band Plan

In those countries where the narrow-band segment 10,368 – 10,370MHz is not available the segment 10,450 – 10,452MHz is suggested as an alternative narrow-band segment

24.0 – 24.25GHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
24,000.000						
Amateur satellite service	24,025,000 *preferred operating frequency wide-band equipment* 24,048 – 24,050 *preferred narrow band operating*	Primary. Users must accept interference from ISM users	Primary. Users must accept interference from ISM users			
24,050.000						
All modes		Secondary. May only be used with the written consent of the Secretary of State. Users must accept interference from ISM users	(Not allocated)	20dBW	Morse 26dBW	Telephony RTTY Data Facsimile SSTV FSTV
24,194.000						
All modes						
24,250.000						

47.0 – 47.2GHz

UK Band Plan		Status of allocations in UK to:		Maximum Power:		Permitted Types of Transmission
		Amateur Service	Amateur Satellite Service	Carrier	PEP	
47,000.000						
	47,088.000 *centre of narrow-band activity*	Primary	Primary	20dBW	26dBW	Morse Telephony RTTY Data Facsimile SSTV FSTV
47,200.000						

Notes to the Schedule

(a) Maximum Power refers to the rf power supplied to the antenna. Maximum power levels will usually be specified by carrier power. For emissions having a suppressed, variable or reduced carrier, the power will be specified by the peak envelope power (pep) under linear conditions.

(b) In the case of frequency bands above 1000 MHz, since high intensities of rf radiation may be harmful, the following safety precaution must be taken. In locations to which people have access, the power flux density on transmit must not exceed the limits recommended by the competent authorities (currently, this limit is 10 mW per square centimetre).

(c) **Primary, permitted and secondary services**

For the purpose of this Licence, frequency bands allocated to the Amateur Service and the Amateur Satellite Service on a primary basis cannot claim protection from Harmful Interference or Undue Interference from any other authorised services, such protection being afforded only to users whose frequencies have been registered nationally or internationally. In the United Kingdom, individual frequency assignments are not registered in the Amateur Service, except for beacons and repeaters. This applies equally to bands allocated on a secondary basis where stations of the Amateur Service and the Amateur Satellite Service are also required not to cause Harmful Interference or Undue Interference to stations of a primary or permitted service to which frequencies are already assigned or to which frequencies may be assigned at a later date.

(d) Any modulation technique (except for pulse emissions below 1000 MHz) may be used for the types of transmission specified in the sixth column of the Schedule which are defined as follows:

Morse: hand or automatically-sent international morse code

Telephony: speech, including selective calling signals

RTTY: radio teletype and AMTOR

Data: digital codes representing numbers, text, speech, images, measurements, computer programmes or other information authorised by the Licence

Facsimile: transmission of fixed or graphic images

SSTV: slow scan (i.e., reduced bandwidth) television

FSTV: fast scan television

(e) **Interpretation**

(i) Carrier Power: The average power supplied to the antenna by a transmitter during one radio frequency cycle taken under the condition of no modulation.

(ii) Effective Radiated Power (erp): The product of the power supplied to the antenna and its gain in the direction of maximum radiation.

(iii) Gain of an Antenna: The ratio, usually expressed in decibels, of the power required at the input of a loss free reference antenna to the power supplied to the input of the antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not otherwise specified, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarisation. The reference antenna is usually a half-wave dipole. The gain may be referred to as decibels relative to a half-way dipole (dBd).

(iv) Mean Power: The average power supplied to the antenna by a transmitter during an interval of time which is sufficiently long relative to the lowest frequency encountered in the modulation taken under normal operating conditions.

(v) Peak Envelope Power (pep): The average power supplied to the antenna by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

RADIO COMMUNICATION

INDEX TO VOLUME 65 - JANUARY TO DECEMBER 1989

please trim pages along this line to fit binder

CONTESTS - DF (rules in square brackets)

DATACOMMS

DXPEDITIONS

EMC MATTERS

FEATURES

IN PRACTICE

LICENSING AND BAND PLANS

MICROWAVES

MISCELLANY

PROJECT YEAR

PROPAGATION

QRP

REVIEWS - EQUIPMENT

REVIEWS - PUBLICATIONS

RSGB AFFAIRS

SATELLITES

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